Is a Gender-Neutral Policy Equitable? Evidence from SEC Enforcements*

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Abstract

The SEC punishes major financial crimes with both monetary fines and professional bars. We document that punishments differ starkly across genders despite the fact that SEC policies are gender-neutral. While total punishments are comparable, men tend to receive combinations of punishment whereas women receive either professional bars or monetary fines, but not both. This evidence is consistent with an enforcement model where admitting guilt through accepting a professional bar entails social stigma. Overall, the SEC's two-dimensional punishment scheme, while gender-neutral, creates disparities between men and women.

JEL Classification: G12, G14, G24

Key words: Financial crime, SEC, justice system, gender gap

The economic approach to crime and punishment presumes that offenders trade off money versus time in punishment (Becker (1968)). Social stigma and other moral considerations are absent from this theory (Akerlof and Kranton (2000)). However, these assumptions are difficult to examine in the U.S. criminal justice system because prison sentences are primarily imposed for serious offenses. Civil enforcement actions by the Securities and Exchange Commission (SEC) provide a unique setting to study the money-time tradeoff since the SEC punishes major financial crimes with both monetary fines and employment bars from the finance industry.[1] For SEC enforcement cases against individuals, we study whether monetary fines and bars are substitutes (Becker (1968)), whether the SEC's punishments are gender neutral (Becker (1957)), and whether and why the mix of punishment varies by gender.[2]

We document that monetary fines and bars are substitutes and that female and male offenders receive comparable total punishment for the same type and degree of misconduct. However, there is substantial heterogeneity in the composition of the punishment by the offender's gender. Female offenders tend to have either long professional bars and a minimal monetary penalty or no professional bars and an above minimum monetary penalty. These male/female differences are also present conditional on the type of offense. However, we do not find evidence of gender-based discrimination in SEC punishments.

To rationalize this evidence we develop a model of enforcement and punishment choice under social norms that builds on the seminal works by Becker (1968) on crime and punishment and Akerlof and Kranton (2000) on social identity. In our model, securities law offenders and/or their legal counsel negotiate with the SEC a punishment bundle consisting of a professional bar of length b and monetary penalty to minimize their CES disutility from punishment as per Becker (1968). The negotiation is bounded from below by a minimum total punishment deemed appropriate by the SEC for a given misconduct. Any negotiation to reduce a professional bar in return for a larger monetary penalty may require cooperation with the SEC and formal admission of guilt, which carries a social stigma disutility.[3] The disutility of social stigma from admitting guilt is zero up

[1] Bars include cease and desist orders, suspension or revocation of broker-dealer and investment advisor registrations, censures, and bars from association with the securities industry.

[2] Our data is on the SEC enforcement actions filed against individuals affiliated with public companies traded on major U.S. exchanges at the time of the alleged misconduct. The Securities Enforcement Empirical Database (SEED) provided by NYU/Cornerstone tracks all 661 SEC enforcement actions filed against individuals between April 2003 and March 2018 as per law.nyu.edu/centers/pollackcenterlawbusiness/seed. Data contains the type of violation, specific statutory sections and rules of the relevant violated regulations, legal case name, district court, case number or file number, relevant court documents, resolution date, and other relevant information. SEC enforcement cases are widely captured by the media and studied by law scholars. There is no clear sample selection bias, apart from any specific focus the SEC itself may set on monitoring and enforcing specific types of violations, and the sample captures the entire set of the SEC enforcement actions over the sample period.

[3] Ample evidence exists that females, who are viewed to be communal and caring, are expected to commit fewer and less severe crimes and have less recidivist risk than males, who are perceived as aggressive, assertive, and competitive (see Chesney-Lind (2002) and Steffensmeier et al. (2005) for evidence on assaults, and Gavrilova and Campaniello (2015) for evidence on property crimes). The socioeconomic consequences for females who elect not to conform to traditional gender roles and engage in socially abhorred conduct and "male-only" activities, including outright criminal behavior, can differ starkly from males, even if the legal system and involved enforcement entities

to a socially acceptable threshold, $\bar{b} > 0$. Beyond this threshold, professional bars generate fixed disutility $\lambda \geq 0$. Disutility due to a monetary penalty is increasing and convex.

Consistent with the empirical evidence, our parsimonious model yields "corner" outcomes with only one form of punishment. The "money corner" is associated with either strong or weak punishments. Under both types of punishment, the net utility gain from selecting a bar length equal to $\bar{b}$ and a high monetary penalty over a bar length longer than $\bar{b}$ and a low monetary penalty greater than λ. It leads to a short bar at the critical non-stigma threshold $\bar{b}$ and to a high monetary penalty. For example, having any professional bar on the employment record reduces the prospects of highly valuable future employment.

The "bar corner" case corresponds to an environment with either a strong preference for longer bars and misconduct warranting mostly minimum monetary penalty. Female offenders may prefer longer professional bars when they have better outside options and desire to save money. Women also prefer professional bars when they fear future discrimination in the labor market which significantly reduces their future employment opportunities in the field of finance. In this case, the utility gain from selecting the maximum bar length and minimum monetary penalty over the bar length below the social stigma threshold $\bar{b}$ and higher monetary penalty is greater than λ. This leads to a long, potentially indefinite, bar and to a relatively low monetary penalty that does not exceed the offender's budget. For example, λ being low is equivalent to having valuable outside options that do not depend on their criminal history.

The model is estimated in the data for the CES utility using the Simulated Method of Moment by matching the probabilities of an interior bundle, money corner, and bar corner which vary with the offender's gender as Figure 2 illustrates. We also use the share of money in the total penalty for all interior bundles to identify the SEC's money-time tradeoff as per Becker (1968). Finally, for the model to explain the heterogeneity in punishments within genders the preference for monetary penalty parameter, α, has to vary across offenders within each gender, but we allow for the variation to be different across genders. Finally, the estimation is valid only if the SEC does not discriminate on gender. We examine how total punishment varies by gender and find no evidence of discrimination by the SEC.[4]

Consistent with Becker (1968), we find that the SEC trades off one year of the professional bar against \$195,000 in monetary penalty, which is much larger than \$144,000 obtained from the same model but without social stigma. The regulatory constraint on mandatory monetary penalties corresponding in the model to a minimum total punishment is such that 31.8% of the total fine needs to be in cash. The estimates of stigma disutility λ vary vastly across genders. While $\lambda_{Male} = 0.101$ indicates that male offenders are subject to a monetized value of social stigma corresponding to 10.1% of the total SEC-imposed fine, $\lambda_{Female} = 0.301$ implies that female offenders are subject

are unbiased. The trial of Phryne in ancient Greece provides an early account of the consequences.

[4]While it seems unlikely given the SEC does not discriminate on total punishment, we cannot rule out the possibility that the SEC offers females only corner punishment bundles of entirely professional bars or entirely monetary penalties. SEC discrimination of this form would not impact our use of gender to estimate the model.

to much more significant social stigma, with a monetized value equal to 30.1% of the total SEC-imposed fine. Finally, we estimate the model under alternative parametric assumptions and find that our findings are robust.

Our finding that male offenders must have a lower social stigma to admitting guilt than female offenders, $\lambda_{Female} < \lambda_{Male}$, is consistent with postmodern gender theory (e.g., Butler 1990) whereby women's choices and performance are expected to adhere to socially constructed regulative discourses. Building on this, legal scholars have extensively argued that societal attitudes toward female offenders are the result of an attempt to enforce sex-role expectations (e.g., Crew 1991; Edwards 1989). Women working in a traditionally male field, like finance,[5] may be subject to double punishment—for committing a crime and for breaking a norm, with the second potentially being even more damaging. Women aware of such a double standard in punishment are more reluctant to admit guilt than men. Unlike females, males in finance do not suffer from such gender stereotypes. Males may also belong to an "old boys" network that helps male offenders, and even repeat offenders, to find employment in the field of their expertise after finishing serving the imposed professional bars, while it is much more difficult for female offenders.[6]

The parameter estimates for offenders' preferences and social stigma and the SEC's money-time tradeoff allow for conducting several counterfactual policy experiments to help assess the welfare impact of different policy choices that the SEC possesses and explore the source of heterogeneity in outcomes across different offenders for the same crime. We entertain three relevant policy experiments: allowing vs. prohibiting punishment bundles, monetizing professional bars, and eliminating regulatory constraints on the minimum penalty. Suppose the SEC would force offenders to choose either a monetary penalty or a professional bar, but not a combination of the two. The model suggests that such a policy is welfare-improving overall. However, the welfare gains are distributed unevenly. A total of 10.8% of male offenders benefit from the punishment bundles with an average welfare gain of 2.8%. By contrast, only 3.2% of females benefit from the punishment bundles with an average welfare gain of merely 0.4%. A wide range of male offenders benefits, with α between 0.42 and 0.64. Females only benefit if α is in a narrow range between about 0.35 and 0.41. These results illustrate that in a Beckerian environment in which the SEC allows offenders to negotiate their bundles, it is mostly male offenders who benefit.

If the SEC would allow offenders to monetize all professional bars according to its own money-time tradeoff then all social stigma would be eliminated by this policy since all offenders would be treated identically. Strictly speaking, the economic approach to crime and punishment according to Becker (1968) suggests making punishments comparable by monetizing bars. Interestingly, the

[5]The Olyver Wyman survey "Women in Financial Services" shows that globally, women occupied only 20% of Board level positions and 16% of Executive Committee member were female in financial services in 2016. The survey projects that at current rates of growth, financial services globally will not reach even 30% female Executive Committee representation until 2048. For more information, see oliverwyman.com/content/dam/oliver-wyman/global/en/2016/june/WiFS/WomenInFinancialServices_2016.pdf

[6]Egan, Matvos, and Seru (2019b) find that male financial advisors with a misconduct record are more likely to find future employment than female advisors with the same record of misconduct.

welfare impact of monetizing professional bars is negative among offenders and across genders. For male offenders, the welfare drop is smaller than for female offenders, presumably because females are more inclined to exit the financial industry. In addition, more male, 63.3%, than female, 55.9%, offenders would be affected by the change. When comparing the distributions of α of affected offenders, we find that the mean and median αs are much lower than in the first counterfactual. Naturally, low-alpha offenders would suffer from monetary penalties, as opposed to punishment bundles that affect offenders in the middle of the alpha distribution. Across genders, female offenders tend to have lower alphas than male offenders thus explaining the larger welfare loss by female offenders.

The final policy option for the SEC is to eliminate minimum monetary penalties irrespective of the severity of the crime. Suppose the SEC would allow offenders to not pay any monetary penalty but instead take a leave from the finance profession if they wish to do so. While this may sound like a straightforward policy option, we find that it has massive welfare and distributional effects. Somewhat surprisingly, this policy counterfactual has a large positive welfare impact. Both male and female offenders would be impacted in about the same proportions, 52.5% male vs. 52.7% female offenders, and by the same amount, 6.92 (6.70) welfare gains for male (female) offenders at the mean and 1.05 (1.03) at the median.

Our counterfactuals imply that simple policy choices exist that alter offenders' welfare while adhering to the core SEC's two-dimensional money-time trade-off and these policy changes need not be discriminatory, either explicitly or implicitly. However, the SEC's or, for that matter, any other regulator's policy choices are not innocuous. They can disproportionately affect different offenders, for better or worse, and create disparities across genders even if they are a-priori unbiased.

An important implication of our findings is that social norms continue to affect females who have succeeded in breaking the "glass ceiling" in the corporate world. Female white-collar professionals, including those at the very top of the corporate ladder violating securities laws, are more likely than comparable men to permanently leave the field of finance. Forward-looking potential entrants into finance may be discouraged due to perceived gender-specific norms and stereotypes. This can further increase gender imbalance in already male-dominated professions.[7]

Literature overview. Our work relates to a novel strand of literature on financial misconduct and punishment. The existing literature mainly focuses on fraud and misconduct among financial advisors (Egan, Matvos, and Seru, 2019a and 2019b; Dimmock, Gerken, and Grahm, 2015; Qureshi and Sokobin, 2015; McCann, Qin, and Yan, 2016). It uses the BrockerCheck database maintained by the Financial Industry Regulatory Authority (FINRA) to document that misconduct is widespread (7.8% of brokers have misconduct disclosures on their record as reported by Egan, Matvos, and

[7]Bertrand and Hallock (2001), Bertrand, Goldin, and Katz (2010) and Bair (2016) document significant gender participation and pay gaps in finance and other high-paying jobs. He and Whited (2023) estimate a structural model of female CEO underrepresentation and find that searching for or switching to a female CEO is very costly, which mirrors our stigma finding.

Seru, 2019a) and that a large share of brokers remain in the industry despite repeated misconduct. While our data shares some of the cases with the BrokerCheck database, misconduct by financial advisors constitutes only 14% of our data.[8] The rest of our data relates our paper to the work on corporate fraud (Povel, Singh, and Winton, 2007; Dyck, Morse, and Zingales 2010 and 2014; Wang, Winton, and Yu, 2010; Khanna, Kim and Lu, 2015; and Parsons, Sulaeman, and Titman, 2015) and misconduct in the mortgage industry (Piskorski, Seru, and Witkin, 2013; Griffin and Maturana, 2018). All of these papers, with the exception of Egan, Matvos, and Seru (2019b), focus on documenting instances of fraud and their welfare implications rather than on their prosecution by legal and regulatory authorities, which is the main focus of our paper.

The effect of offender gender on punishment has been studied by Egan, Matvos, and Seru (2019b) in the context of financial advisors. For a sample of financial advisors from BrokerCheck they find substantial differences in the punishment of misconduct across genders, with female advisors being punished more severely. Specifically, they report that following an incidence of misconduct, female advisors are 20% more likely to lose their jobs and 30% less likely to find new jobs relative to male advisors. Unlike Egan, Matvos, and Seru (2019b) we do not find that female offenders are punished more severely than male offenders in the SEC enforcement actions. All else being equal, female offenders in our sample tend to receive a different combination of professional bars and monetary penalties than male offenders, but the combined penalties are comparable across genders. This difference is because in Egan, Matvos, and Seru (2019b) female advisors face a disproportionate share of misconduct complaints initiated by the firm, instead of regulators like in our data. Egan, Matvos, and Seru (2019b) find supporting evidence for taste-based discrimination existing within firms employing financial advisors. They report that firms with a greater percentage of male executives or owners at a given branch tend to punish female advisors more severely following misconduct and also tend to hire fewer female advisors with records of misconduct. We do not find evidence of either discrimination or lenience in our data—male/female judges do not impose different penalties on female/male than male/female offenders. However, the labor market outcomes in Egan, Matvos, and Seru (2019b) can explain the male/female difference in estimated stigma.

Our work also contributes to a large body of legal literature studying the role of gender in sentencing outcomes. These studies find that women if sentenced, are less likely to receive custodial sentences (Freiburger and Hilinski, 2013; Gruhl, Welch, and Spohn, 1984; Harrington and Spohn, 2007; Spohn and Beichner, 2000; Spohn and Spears, 1997), are less likely to serve long prison terms (O'Neil 1999; Koons-Witt, Sevigny, Burrow, and Hester, 2014; Steffensmeier, Ulmer, and Kramer, 1998) and more likely to benefit from downward departure sentencing (Bontrager, Barrick, and Stupi, 2013; Steffensmeier, Kramer, and Streifel, 1993). These results hold for all types of courts, including the federal court system (Starr 2015). Unlike these papers, we find that in the

[8]The SEC handles most severe fraud cases by financial advisors, which is a small fraction of all misconduct reported in BrokerCheck. Table 2 in Egan, Matvos, and Seru (2019a) shows that all regulatory misconduct disclosures contribute 0.1% (Regulatory - Final and Regulatory - Pending) to the flow of new disclosures and 1.24% to the stock of disclosures.

case of misconduct involving the U.S. securities laws, the offender's gender affects the punishment's composition but not the total punishment.

1 Institutional Background on SEC Enforcement

Both the Securities and Exchange Commission (SEC) and the Federal Bureau of Investigation (FBI) have a law enforcement function. The SEC is focused on securities law violations and can trigger civil and administrative actions, while the FBI has a broader scope on a variety of violations and can bring criminal as well as civil and administrative action against offenders. The SEC conducts all investigations privately. It cooperates with the FBI and other federal agencies depending on the case. For instance, as the SEC has no actual law enforcement authority, they inform the FBI if an offender needs to be retained. A special division of the SEC, the Enforcement Division (ED), conducts all investigations. ED obtains evidence from market surveillance activities, investor tips and complaints, other divisions and offices of the SEC, self-regulatory organizations and other securities industry sources, and media reports. With a formal order of investigation, the ED's staff compels witnesses by subpoena to testify and produce records.[9]

1.1 Laws and Rules enforced by the SEC

The main laws that the SEC enforces are governed by the Securities Act of 1933, the Exchange Act of 1934, the Investment Advisors Act of 1940, The Investment Company Act of 1940, the Sarbanes-Oxley Act of 2002, and the Dodd-Frank Act of 2010. The SEC either directly uses these acts or develops its own rules under the umbrella of these acts for adjudicating misconduct. Laws, rules, and regulations enforced by the SEC can be roughly split into three main categories: (i) Regulation of broker-dear, investment advisors, and other individuals involved in securities transactions; (ii) Sales and distribution of securities; (iii) Everything related to financial reporting and other informational releases. Here we briefly cover laws and rules applicable to the most frequent violations found in our data.

Broker-dealer misconduct is litigated according to Sections 15b-4 and -6, as well as Sections 15a and 19h of the 1934 Act. Disciplinary proceedings concerning investment advisors and persons associated with investment advisors are adjudicated in accordance with Sections 203(e) and 206 of the Advisors Act. Disciplinary proceedings and other adjudications concerning investment companies and persons associated therewith are adjudicated pursuant to Sections 8, 9, and 41 of the 1940 Act. The SEC adjudicates administrative disciplinary proceedings pursuant to Rule 2e of the SEC's Rules of Practice against attorneys, accountants, engineers, and other similar professionals who practice before the Commission or who may have some degree of involvement in securities transactions. Bribery in the transacting of foreign and domestic securities is adjudicated in accor-

[9]More details can be found at sec.gov/enforce/how-investigations-work.html.

dance with Section 30A of the Exchange Act. Finally, Section 20 of the Exchange Act of 1934 and Section 15b of the Securities Act of 1933 provide that a person controlling any person liable for misconduct may be liable jointly and severally and to the same extent as its controlled person.

Sales and distribution of securities are mostly governed by the Securities Act of 1933. Section 17a of this act generally prohibits fraud and misrepresentation in the offer or sale of securities. Sections 11 and 12 of the same act impose liability for any material misstatements or omissions made in connection with registered offerings. Section 5b-1 of the Securities Act prohibits the use of any prospectus that does not satisfy SEC requirements. In addition, Section 5b-2 of the same act prohibits any registered sale of a security unless the security is preceded or accompanied by a prospectus that satisfies SEC requirements. Finally, suspensions of over-the-counter or exchange trading of security are imposed by the SEC under sections 12k and 15c-5 of the 1934 Act.

The requirement to disclose all material information is covered by Rule 12b-20 of the Exchange Act of 1934. Section 18 of the Exchange Act imposes liability for false and misleading statements in documents filed with the SEC. Any information releases, not just filed with the SEC, are covered by Exchange Act Section 10b and Rule 10b-5. These provisions broadly prohibit fraudulent and deceptive practices and untrue statements or omissions of material facts in connection with the purchase or sale of any security. Section 13a of the Exchange Act establishes the reporting requirements for securities registered in accordance with Section 12 of the same act. SEC rules based on Section 13a are, for instance, Rule 13a-1 and 13a-13 which applies to quarterly (Form 10-Q), Rules 13a-1 and 13a-11 which apply to periodic (Form 8-K) reports, Rule 13a-2 which applies to the annual report (Form 10-K), Rule 13a-14 which applies to certification of disclosure in annual and quarterly reports, and Rule 13a-15 which applies to overall controls and procedures. The proxy communication machinery of the SEC is based on Section 14a of the 1934 Act. For example, Rule 14a-1 specifies the information to be part of proxy communication, while Rule 14a-8 establishes a procedure through which shareholders can force management to include in its proxy materials their own proposals and one-hundred-word statements in support of such proposals. Misconduct involving certain types of defective 1934 Act reports or filings is adjudicated in accordance with section 15c-4 of the 1934 Act. These reports must be filed in accordance with sections 13 and 15 of the 1934 Act, such as annual or periodic reports or registration statements covering over-the-counter or exchange trading.

1.2 Types of SEC enforcement

If the SEC initiates charges against the firm, individual, or both, it can choose to bring either an administrative proceeding or civil litigation, or both. In a civil action, the SEC files a complaint with a U.S. District Court and asks the court for a punishment or remedy. Administrative proceedings differ from civil court actions *prima facie* in that they are heard by an administrative law judge (ALJ) who is independent of the SEC. In an administrative action, the ALJ presides over a hearing

and considers the evidence presented by the ED staff, as well as any evidence submitted by the subject of the proceeding. Following the hearing, the ALJ issues an initial decision that includes findings of fact and legal conclusions. The initial decision also contains a recommended punishment. Both the ED staff and the offender may appeal all or any portion of the initial decision. The SEC may affirm the decision of the ALJ, reverse the decision, or remand it for additional hearings. The choice of administrative proceedings or civil litigation depends on the type of punishment being sought. For instance, the SEC may bar someone from the brokerage industry in an administrative proceeding, but an order barring someone from acting as a corporate officer or director must be obtained in a federal court. When the misconduct warrants it, the SEC might bring both types of proceedings. The SEC can also refer the case to the Department of Justice (DOJ) for criminal proceedings, which is usually reserved for cases of severe misconduct.

While they have started as a means to oversee regulated entities, administrative proceedings have gradually taken over the field of securities law. Congress has repeatedly expanded the authority of the SEC to pursue violations of securities laws in proceedings adjudicated by the SEC's own ALJs, most recently through the Dodd-Frank Act. The SEC is now allowed to impose civil penalties through its own administrative proceedings on essentially anyone it finds to have violated the federal securities laws. As a result, there has been a decline in the number of court cases and a corresponding increase in the number of administrative proceedings post-Dodd-Frank (see Choi and Pritchard, 2017), a period covering most of our sample.

In the majority of SEC enforcement actions, a consent settlement is the most effective disposition for the clients involved.[10] Settling the enforcement action provides the SEC, as well as the offender(s), maximum flexibility in tailoring an appropriate punishment to fit the peculiarities of a particular case. In a seminal work on litigation and settlement of SEC enforcement actions Mathews (1980, Catholic University Law Review) points out on p. 274 that "since an injunction may trigger a host of direct and indirect statutory disqualifications, defense counsel may find it advantageous to negotiate a consent settlement in an administrative disciplinary proceeding rather than risk litigation of a civil injunctive action." Of course, the SEC counsel has the final say on whether to settle the case or move on with the litigation.

In many cases, the decision to settle hinges on the degree of cooperation from the offender(s) and can be viewed as a reward for "good behavior." A settlement proposal is also more likely to be accepted if the offender agrees to adopt new procedures designed to help prevent a recurrence of

[10]See Mathews, *Effective Defense of SEC Investigations: Laying the Foundation for Successful Disposition of Subsequent Civil, Administrative, and Criminal Proceedings*, 24 EMORY L.J. 567 (1975). "In representing witnesses in SEC investigations, and particularly in attempting to bring an investigation to a timely conclusion by negotiating a consent settlement in some type of formal enforcement action to be instituted, counsel must be cautious to maintain that important sense of credibility with the SEC and its Staff. Vigorous, alert representation of a client in the investigatory stage, including preparation of a forceful Wells Committee Submission, coupled with astute negotiations in an atmosphere of complete credibility, should, in the view of the writer, lead to a satisfactory settlement of the overwhelming majority of a securities attorney's enforcement cases, rather than pursuit of lengthy, expensive, arduous and usually harmful litigation."

the violation charges. Since before 2013 the SEC has used a no-admit/no-deny policy for consent settlements, offenders with high disutility to public guilt admittance may find the consent settlements advantageous to trial litigation. The high-profile cases where the SEC and/or the offender do not settle without trial are particularly interesting. Detailed public records exist for the cases that went to trial. In addition to any explicit punishments, these cases are associated with public shaming and stigma. They can be viewed as the most extreme cases of securities law violations that got caught and successfully prosecuted.

In June 2013, the SEC made a major change to its policy regarding settlements: Instead of routinely settling matters on a no-admit/no-deny basis, the SEC began to require admissions from settling respondents and offenders in certain cases. This new policy has shifted some traditionally settled cases into trials. This was particularly acute in cases involving large financial institutions that were thought to have played a role in causing the financial crisis of 2008. In one prominent example involving Bank of America's acquisition of Merrill Lynch at the height of the financial crisis, Judge Jed Rakoff, of the Southern District of New York, rebuked the SEC and refused to approve a consent judgment in part because it did not contain any admissions of wrongdoing.[11] Judge Rakoff set the case for trial. Cooperation and compliance with the SEC and admission of guilt are, as a result, important features to consider when comparing punishment outcomes.

For cases that have not been settled, offenders generally prefer to litigate in federal court because of the rights afforded there, including broad discovery procedures and an independent federal judge and jury to decide the case. The SEC prefers to seek most remedies in the administrative procedures, which involves a much more expedited proceeding that generally limits discovery by the parties to the evidence gathered during an investigation. Overall, the SEC defers more, at least lately, to administrative judges to develop the law as it prefers rather than using federal district judges, who may be less amenable to its arguments.

1.3 Types of SEC punishments

The SEC can seek a variety of punishments through the administrative proceeding process and in federal court. Disciplinary punishments come in two forms, civil monetary penalties as well as non-monetary penalties affecting the offender's professional standing. Civil monetary penalties are punitive fines imposed by the SEC. They constitute the main direct monetary punishment imposed on a securities law offender. Civil monetary penalties are calculated based on an inflation-adjusted schedule.[12] During much of our sample period, from March 2009 to March 2013, the civil monetary penalty for a natural person for fraud and substantial losses or risk of losses to others or gains to self ranged from \$7,500 to \$150,000 per violation count. The maximum per violation increased to \$160,000 in March 2013 and to \$173,437 in November 2015. Importantly, while the penalty per violation is set on a scale, the number of violations, that is, the scaling factor to compute the total

[11] See SEC v. Bank of Am. Corp., 653 F. Supp. 2d 507, 512 (S.D.N.Y. 2009).

[12] For more information please see sec.gov/enforce/civil-penalties-inflation-adjustments.htm

punishment, is subject to judgment.

The type of non-monetary penalty depends on the securities law. For instance, the disciplinary penalties that may be imposed against persons and entities in broker-dealer proceedings fall under the Exchange Act of 1934 and Advisors Act of 1940 and include outright revocation of license (or denial of registration); bar from association with a broker-dealer; suspension of license or association; the placing of limitations on the activities or functions of a person or entity; or censure. Sanctions imposed under Rule 2e of the SEC's Rules of Practice, i.e., those applied to accountants, attorneys, engineers, and other professionals, are limited to a suspension or bar from practice before the Commission.[13] Professional bars are publicly disseminated and are monitored by the SEC. They can have long-lasting detrimental consequences for the offenders' labor market opportunities. Both administrative and court proceedings can impose punishments that are either civil monetary penalties or bars, or a combination of both types, and they can include multiple bars.

The SEC may also seek the return of illegal profits, so-called disgorgements, and prejudgment interest in addition to civil monetary penalties. Civil monetary penalties, disgorgements, and prejudgment interest together constitute the total monetary penalty for an offender. The calculation of monetary penalties is important to whistleblowers. Under the Dodd-Frank Act's SEC Whistleblower Program, the SEC will issue an award to a whistleblower who provides original information that leads to a successful SEC enforcement action if the total monetary penalty exceeds $1 million. A whistleblower may receive an award of between 10% and 30% of the total monetary penalties collected. In addition, the SEC often asks for a court order, called an injunction, that prohibits any further acts or practices that violate the law or SEC rules. An injunction can also require audits, accounting for fraud, or special supervisory arrangements. The court may also bar or suspend an individual from serving as a corporate officer or director. A person who violates the court's order may be found in contempt and be subject to additional fines or/and imprisonment.

Both types of monetary penalties, civil penalty, and disgorgement/prejudgment interest, can be individual specific or shared between offenders. Our empirical analysis considers only recorded total punishment and disgorgement amounts for which offenders are individually liable, i.e., civil penalties, disgorgement amounts, prejudgment interest, and other penalty amounts explicitly reported as total amounts in the associated SEC document. If multiple amounts are reported for an offender within the same action, i.e., in different SEC documents for the same action, the totals from the most recent SEC document are used.

2 Data and Descriptive Statistics

We collect data on SEC enforcement cases from a number of public data sources. The SEED database provided by NYU/Cornerstone tracks and records information for SEC enforcement actions filed against public companies traded on major U.S. exchanges and their subsidiaries and

[13] 17 C.F.R. § 201.2(e) (1979).

against individuals affiliated with them.[14] We use all 661 SEC enforcement actions against individuals reported in SEED between April 2003 and March 2018. The number of observations reflects the fact that SEC enforcement actions against public entities and their employees are rare, yet visible events in the public domain. SEC enforcement cases are widely covered by the media and studied by law scholars. Therefore, sample selection bias is limited to any potential focus the SEC itself may have on monitoring and enforcing any specific sectors and types of violations. The sample captures the entire set of successful publicized SEC enforcement actions over the sample period.

The variables in SEED include offender names, violations, venues, and resolutions. For offender names, SEED uses standardized names of the offender explicitly named in the enforcement action. For violations, SEED records the specific statutory sections and rules of the Exchange Act, Securities Act, and other regulations the offender is alleged to have violated. For the allegation type, each enforcement action is assigned a category describing the SEC's primary allegation against the offender. SEED also stores the legal case name, district court, case number or file number, relevant court documents, and the resolution date. The resolution date is the date of the earliest document that mentions a resolution of the enforcement action. We define the length of the legal proceedings as the difference between the first resolution date and the first document date reported in SEED, expressed in years. The length of legal proceedings varies significantly with the type of filing.

If available, the total monetary penalty and disgorgement numbers are taken from the relevant SEC document. When the total is not reported, it is computed as the sum of the individual figures for a civil penalty, disgorgement, prejudgment interest, and other monetary penalties. If there is more than one document for the same offender in the same action that contains a penalty or disgorgement amount, the most recent document is used. Some penalties and disgorgement are shared across multiple offenders. The database notes when a penalty or disgorgement is shared and reports the full shared penalty and disgorgement for each separate offender. Information on the professional bar(s) is also parsed from SEED. Each bar comes with a term. We define the bar length as the longest bar length across all bars received.

We augment the SEED database with other publicly available information. We start with the information on the offender's name etymology in SEED. We classify the offender's name according to its origin and most common use into five regions: North America (424, 78.37%), Asia (48, 8.87%), EMEA (38, 7.02%), South America (16, 2.96%), India (15, 2.77%). Next, we use public information to identify the offender's gender. We collect and verify data through automated data scraping from a variety of sources. We determine offender characteristics, including gender and the name etymology, by crawling the SEC website,[15] searching Google for press articles related to SEC

[14] According to the SEED website (law.nyu.edu/centers/pollackcenterlawbusiness/seed/methodology), the data is collected from publicly-available documents released by the SEC and publicly-available court orders, if resolution information is not released by the SEC. Each SEC enforcement-related document is analyzed and information on characteristics of each enforcement action is recorded.

[15] The enforcement division of the SEC provides information on SEC enforcement actions via its website (sec.gov/litigation.shtml). We also search the SEC releases and press articles for gender-specific words, such as 'Miss, ''Mrs.', 'Mr.', 'she' or 'he', 'her' or 'his.'

Table 1: Descriptive statistics

The table documents descriptive statistics of SEC trial cases. The sample consists of all offenders in each legal case against individuals in the SEED database between 2003 and 2018. The number of individual cases/offenders is 574. The total number of civil and administrative proceedings is 648.

	N/Fraction	Mean	S.D.	Min	Median	Max
No. of trial cases	648					
No. of offenders	574					
No. of offenders per trial		3.46	4.30	1.00	2.00	20.00
Female offenders	10%					
Allegation type:						
Issuer reporting and disclosure	54%					
Broker-dealer and trading	14%					
Investment advisory	13%					
Securities offering	6%					
Market manipulation	6%					
FCP Act	3%					
Munis and public pension	2%					
Other	1%					
Filing format:						
Civil filing only	47%					
Administrative filing only	40%					
Civil and administrative filing	13%					
Sanction type:						
monetary penalty only	32%					
monetary penalty and bar	26%					
Bar only	25%					
Monetary penalties:						
monetary penalty>0	58%					
monetary penalty ($K)	376	952.85	4,693.97	2.24	100.00	60,000.00
Bars:						
Barred	51%					
Barred for life	22%					
Barred for life, if barred	43%					
Length of bar, if barred	331	8.39	6.06	0.08	5.00	15.00
Length of proceeding:						
Length of proceeding reported	44%					
Length of proceeding	286	2.04	2.50	0.00	1.10	9.99

enforcement, and looking up offenders on Linkedin. Data also include reports of investigations, litigation releases concerning civil lawsuits brought by the Commission in federal court, notices and settlements on administrative proceedings, and accounting and auditing enforcement releases. Finally, we look up the picture of the offender on Linkedin to try to unambiguously determine the gender of the offender.

Table 1 documents descriptive statistics on the SEC cases. The sample consists of all offenders in each legal case adjudicated by the SEC against individuals between 2003 and 2018. The number of individual cases/offenders is 574. Because the SEC pursues both civil and administrative pro-

ceedings in some cases, the total number of proceedings is 648. 10% of the offenders are female. Issuer reporting and disclosure cases constitute 54% the majority of cases, followed by broker-dealer and trading cases (14%), and investment advisory cases (13%).

In 47% of cases, the SEC files only a civil suit. Only administrative filings occur 40% of the time. Both civil and administrative charges represent 13% of the cases.[16] The number of offenders in the majority of cases is small, with a mode of 1, median of 2, mean of 3.46, and maximum of 20.

Sanctions are about equally split between joint monetary penalties and bars (26%), monetary penalties only (32%), and bars only (25%). The SEC imposes a monetary penalty in 58% of cases. monetary penalties are highly skewed. Therefore, we use a log scale for monetary penalty: MoneyPenalty=log10(Penalty in $M + 1e-4)+4. Thus, MoneyPenalty equals 0 for no penalty, 1 for a $1K penalty, 2 for $10K, 3 for $100K, 4 for $1M, 5 for $10M, 6 for $100M, etc.

The mean non-zero monetary penalty is $952.85K (3.98 in log terms) and the median is $100K (3 in log terms), which is close to the SEC's Tier 2 civil monetary penalty of $80K imposed for violations involving fraud, deceit, manipulation or deliberate or reckless disregard of the regulatory requirement. The largest penalty is $60M.

51% of the offenders in our sample are subject to some type of professional bar, while 22% of all offenders and 43% of barred offenders receive indefinite professional bars. Out of all offenders who received professional bars, several offenders received multiple bars with the maximum number of bars equal to four. As noted above, in cases with multiple bars our bar variable is coded as the longest bar. The mean number of bars equals 1.31 with the standard deviation equal to 0.57, while the median number of bars is one. Excluding indefinite bars, the mean bar length for the whole sample is four years, and, conditional on receiving a bar, it increases to 8.39 years. 44% of cases have a start and resolution date for the proceedings. The average proceeding lasts for 2 years with a median length equal to 1.1 years and the longest proceeding going as long as 10 years.

3 Gender-Neutral Professional Bar vs. Monetary Penalty

To motivate our empirical analysis, we start with a simple model of SEC enforcement in the spirit of Becker (1968) and provide indicative evidence of the model's failure in the context of SEC enforcement.

3.1 Beckerian model

In this simple setting, offenders of securities laws, or/and their legal counsel, negotiate with the SEC a punishment bundle consisting of a professional bar $b \geq 0$ and a monetary penalty $m \geq 0$ to

[16] Thus only a small fraction of our cases overlap with the BrokerCheck database considered by Egan, Matvos, and Seru (2019).

minimize their disutility from punishment. The enforcement agency imposes a total punishment of

$$I = m + \gamma b > 0, \tag{1}$$

where, following Becker (1968), $\gamma b \geq 0$ represents a money equivalent of the professional bar length with γ being the rate used by the SEC to monetize professional bars. When written as $m = -\gamma b + I$ equation (1) can be interpreted as the SEC's monetary penalty demand curve. The model assumes that the conversion rate, γ, is a constant. This assumption is in the spirit of Becker (1968) and is consistent with the SEC monetizing professional bars as the present value of lost annual earnings, potentially growing at a constant rate, per each year barred, discounted at a constant discount rate.[17] It ignores the time-varying discount rate or/and the diminished earnings potential upon labor market re-entry, both of which are very hard for the SEC to account for. The total punishment, I, is a commensurate punishment for committed misconduct and thus can be viewed as its "severity". Both I and γ are independent of the offender's socioeconomic characteristics such as gender, age, race, and wealth. This is consistent with the SEC's policy of fair enforcement practices. For instance, the SEC's "Enforcement Manual" states that "Values integral to that mission are: ... Fairness – assuring that everyone receives fair and respectful treatment, without regard to wealth, social standing, publicity, politics, or personal characteristics."

In addition, misconduct warrants a non-negotiable minimum monetary penalty of $\overline{m} \geq 0$. Since $\overline{m}$ is the minimum monetary penalty, $(I - \overline{m})/\gamma$ represents the maximum professional bar length. We then define a set of feasible punishment bundles, $\mathcal{P}^F$, as

$$\mathcal{P}^F \equiv \{(m, b) \in \mathbb{R} \times \mathbb{R} | m \geq \overline{m}, b \geq 0, m + \gamma b = I\}. \tag{2}$$

To be as general as possible, we assume that an offender has a direct convex disutility $U(m, b)$ over the punishment bundle $(m, b) \in \mathcal{P}$. It satisfies standard conditions $U_{11} \geq 0$, $U_{22} \geq 0$, and has a positive semi-definite Hessian. Such disutility admits a punishment bundle $(m^\star, b^\star) \in \mathcal{P}^F$ solving

$$(m^\star, b^\star) \equiv \underset{(b,m)\in\mathcal{P}^F}{\arg\min}\, U(m, b) \Leftrightarrow (I - \gamma b^\star, b^\star) = \underset{b\in[0,(I-\overline{m})/\gamma]}{\arg\min}\, U(I - \gamma b, b), \tag{3}$$

leading to a standard first-order condition

$$\gamma = \frac{U_2(m^\star, b^\star)}{U_1(m^\star, b^\star)}, \tag{4}$$

pinning down the rate γ as the ratio of marginal utilities. The FOC (4) can also be interpreted as a "supply" equation for a monetary penalty. In the case of a CES disutility, $U(m, b) = \left(\alpha^{1-\beta} m^\beta + (1 - \alpha)^{1-\beta} b^\beta\right)^{\frac{1}{\beta}}$, the individual components of the punishment bundle are constant frac-

[17] Strictly speaking, this holds true when b and m are the log-transformed bar length and, respectively, monetary penalty—equivalent to how we use the variables in our empirical implementation.

tions of the total punishment, I:

$$\begin{aligned} m^\star &= \max\left\{(1-\tfrac{\gamma}{\gamma+\gamma^{\frac{1}{1-\beta}}\frac{\alpha}{1-\alpha}})I, \overline{m}\right\}, \\ b^\star &= \min\left\{\tfrac{1}{\gamma+\gamma^{\frac{1}{1-\beta}}\frac{\alpha}{1-\alpha}}I, \gamma^{-1}(I-\overline{m})\right\}. \end{aligned} \tag{5}$$

On the set of feasible punishment bundles, $\mathcal{P}^F$, CES disutility for interior solutions yields a linear Engel curve for all I:

$$m^\star = -\gamma \cdot g^\star \cdot b^\star, \tag{6}$$

where the elasticity of substitution between monetary penalties and professional bars is:[18]

$$g^\star \equiv \frac{d\log(m^\star)}{d\log(b^\star)} = -\frac{1-\alpha}{\alpha}\gamma^{-\frac{\beta}{1-\beta}}. \tag{7}$$

3.2 Indicative evidence and model failure(s)

To begin our empirical analysis we start with a reduced-form approach based on this model. In the data, we observe both monetary penalty, monetary penalty$_{ijt}$, and professional bars, Length of Bar$_{ijt}$, for offender i in proceeding j at time t as functions of the same set of observable characteristics, $\boldsymbol{X}_{ijt}$, to capture variation in I. Characteristics $\boldsymbol{X}_{ijt}$ consist of fixed effects from the 8 allegation types, 27 violations alleged, 13 job positions, 37 court districts, and 10 offender counts described in Appendix A.

We proceed by taking the log of (6) and removing the component due to observable characteristics from both punishments using the following regression specifications:

$$\begin{aligned} \log(\$1 + \text{monetary penalty}_{ijt}) &= \alpha_M + \boldsymbol{\beta}_M'\boldsymbol{X}_{ijt} + \varepsilon_{ijt}, \\ \log(1yr + \text{Length of Bar}_{ijt}) &= \alpha_B + \boldsymbol{\beta}_B'\boldsymbol{X}_{ijt} + \eta_{ijt}. \end{aligned} \tag{8}$$

We then define the residual (unexplained) components of monetary penalties, $\widehat{\varepsilon}_{ijt}$, and professional bars, $\widehat{\eta}_{ijt}$, unexplained by $\boldsymbol{X}_{ijt}$, as

$$\begin{aligned} \widehat{\varepsilon}_{ijt} &\equiv \underbrace{\log(\$1 + \text{monetary penalty}_{ijt})}_{\text{Actual monetary penalty}} - \underbrace{\widehat{\log(\$1 + \text{monetary penalty}_{ijt})}}_{\text{Predicted monetary penalty}}, \\ \widehat{\eta}_{ijt} &\equiv \underbrace{\log(1yr + \text{Length of Bar}_{ijt})}_{\text{Actual Length of Bar}} - \underbrace{\widehat{\log(1yr + \text{Length of Bar}_{ijt})}}_{\text{Predicted Length of Bar}}, \end{aligned} \tag{9}$$

and inspect the relationship between $\widehat{\varepsilon}_{ijt}$ and $\widehat{\eta}_{ijt}$. We compute the predicted monetary penalty, $\widehat{\log(\$1 + \text{monetary penalty}_{ijt})}$, and predicted length of the bar, $\widehat{\log(1yr + \text{Length of Bar}_{ijt})}$ using

[18] The expression for $g^\star$ follows from differencing the budget constraint $m^\star + \gamma b^\star = I$ and using relations (5).

the estimated regression coefficients $(\widehat{\alpha}_M, \widehat{\boldsymbol{\beta}}_M, \widehat{\alpha}_B, \widehat{\boldsymbol{\beta}}_B)$.[19]

We illustrate the results graphically using binscatter plots. The simple model predicts (un)explained penalties to be negatively correlated. Panel A of Figure 1 shows that the relation between unexplained monetary penalty and unexplained length of the bar is indeed negative. The correlation in unexplained penalties equals -0.31 ($p < 0.01$). When we measure the substitution between money and time by a regression of the residuals on each other, we find

$$\widehat{\varepsilon}_{ijt} = \overbrace{\underset{(t=-6.45)}{-0.72}}^{g^\star} \star \widehat{\eta}_{ijt} + u_{ijt}, \tag{10}$$

where the standard errors are robust to heteroskedasticity and clustering at the case level (for when there are multiple offenders). The fitted values of the unexplained monetary penalties from the regression (10) are shown in Panel A of Figure 1 using a solid line, with the grey area around the line indicating the confidence interval. The estimated elasticity of -0.72 implies the substitution between money and professional bars is not one-to-one. Instead, a 10% increase in the professional bar length results in a 7.2% decline in monetary penalties. Economically, for an offender with a 5-year bar and a \$1 million monetary penalty, this elasticity implies a 1-year reduction in bar increases the monetary penalty by \$144,000.

However, specification (8) does a poor job predicting the corner outcomes; zero penalties and largest penalties.[20] The left plot in Panel B of Figure 1 uses a log-log graph to plot the predicted monetary penalty against the actual monetary penalty. The fit is quite good for non-zero monetary penalties, but the log-linear model (8) struggles to explain zero and largest ($\geq$\$1M) monetary penalties (a linear model does too) and, as a result, yields a too flat prediction line.

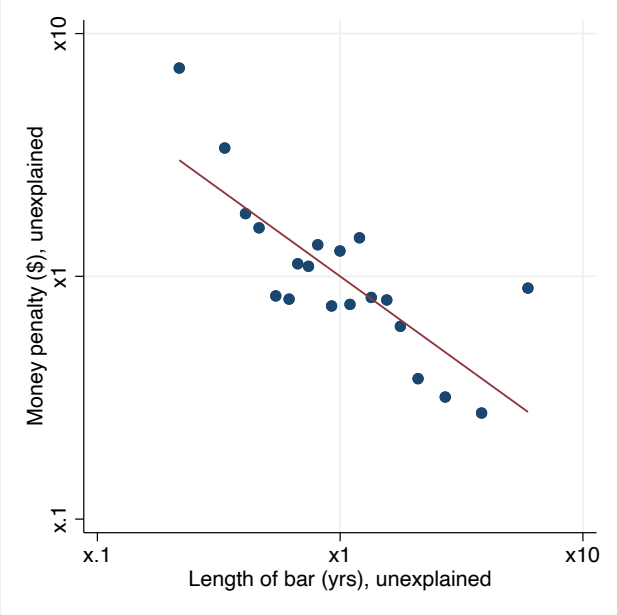
Specifically, the regression model (8) predicts positive monetary penalties for offenders who have zero monetary penalties, and it predicts much lower monetary penalties for offenders with monetary penalties greater than \$10,000. For instance, offenders with monetary penalties greater than \$100,000 are predicted to have less than \$50,000. Moreover, actual professional bars are as difficult to predict as monetary penalties using log-linear specification (8) due to bunching at bar lengths equal to 1, 2, 3, 4, 5, and 10 years, as well as indefinite bars. The right plot of Panel B graphs predicted against the actual length of the bar. The regression (8) overfits professional bars shorter than 2 years and underfits professional bars longer than 3 years.

The reason for the model's failure in both cases is that it does not capture well the corner outcomes. One reason may be that the regression model (8) does not adjust for the endogenous sorting

[19] For this analysis, we restrict the sample to the 541 cases in which at least one of the monetary penalty and professional bar are not zero. The residuals capture the unexplained penalties. Adding unity to monetary penalties and professional bars under the log allows us to accommodate offenders with either zero monetary penalties or zero professional bars. Finally, we use 15 years to quantify an indefinite professional bar, but our results are robust to alternative specifications of 20, 25, and 50 years.

[20] We, therefore, examine the corner cases separately. The blue dots in Figure 1 show the relationship between unexplained monetary penalty and unexplained length of the bar for offenders with no monetary penalty or no bar. Here, the negative correlation in unexplained penalties is even more negative.

Panel A: Unexplained monetary penalty vs. unexplained length of bar



Panel B: Explained vs. actual monetary penalty (left) and length of bar (right)

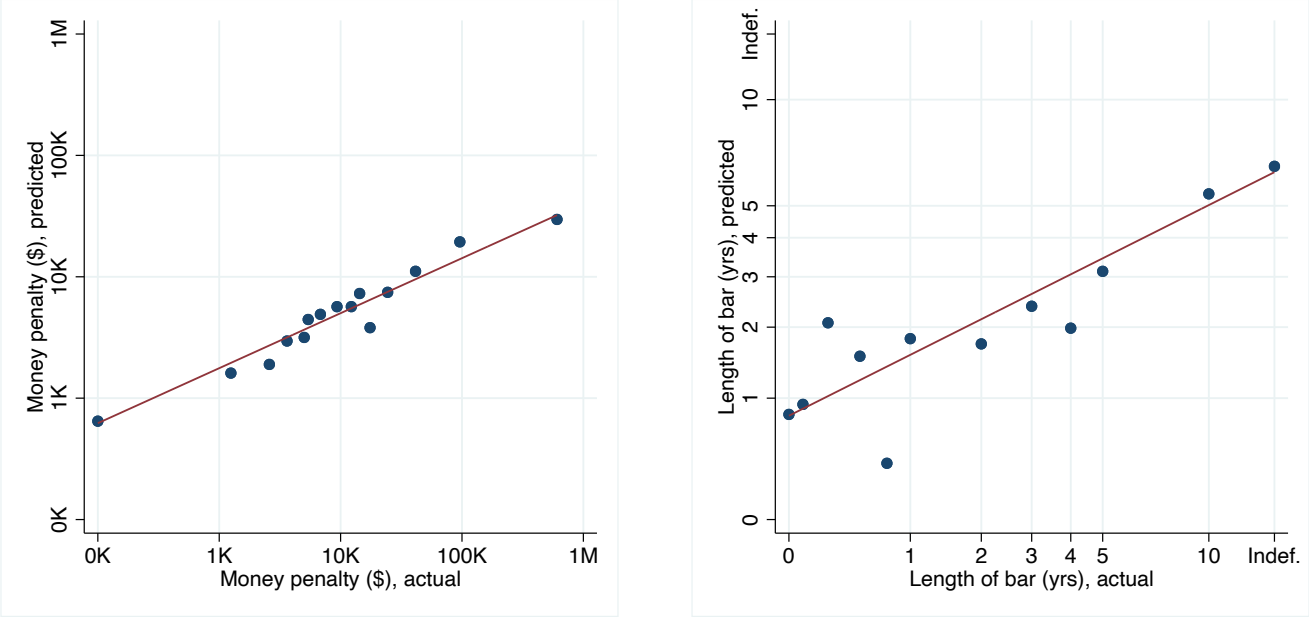


Figure 1: Relation between monetary penalty and length of bar

The figure documents the relation between the monetary penalty and the length of the bar using binscatter plots. Panel A graphs the relation between unexplained monetary penalty $\widehat{\varepsilon}_{ijt}$ and unexplained length of bar $\widehat{\eta}_{ijt}$, defined in equation (9). The solid line shows the fitted OLS regression of the unexplained monetary penalty on the unexplained length of the bar. Panel B graphs predicted against actual values. The left plot shows the explained monetary penalty, $\widehat{\log(\$1 + \text{monetary penalty}_{ijt})}$, calculated from the regression model (8) against its actual value. The right plot shows the explained length of the bar, $\widehat{\log(1 + \text{Length of Bar}_{ijt})}$, against its actual value.

into penalty bundles influenced by the offenders' gender, an observable exogenous characteristic we have yet to exploit. There exist several compelling reasons for gender to play an important role in

explaining the variation in the SEC penalty bundles. Substantial evidence exists on gender differences in economic domains including labor, consumption, and investment, and in social domains including reciprocity, altruism, and trust. Beyond potentially different preferences, an explanation for these findings is that gender differences arise from prevailing social norms. Norms govern, from the ancient to modern societies, what is appropriate behavior for each gender, with deviations being externally punished (e.g., Akerlof, 1976; Kandori, 1992; Cole et al., 1992) or costs of deviation being internalized (e.g., Akerlof and Kranton, 2000; Huang and Wu, 1994). Therefore, females, who are viewed to be communal and caring, are expected to commit fewer and less severe crimes and have less recidivist risk than males, who are perceived as aggressive, assertive, and competitive.[21] The socioeconomic consequences for females who do not conform to traditional gender roles and engage in socially abhorred conduct and "male-only" activities, including outright criminal behavior, can differ starkly from males, even if the legal system and involved enforcement entities are unbiased. Therefore, female offenders may choose the SEC punishment bundle conforming with their traditional gender role and very different from the punishment bundles chosen by male offenders.

An alternative or, potentially complementary factor, directly related to our model, is the fact that women are more risk-averse than men.[22] However, another competing hypothesis is that gender differences in economic and social outcomes arise from discrimination (Egan, Matvos, and Seru, 2019; Card, DellaVigna, Funk, and Iriberri, 2019). The effect of offender gender on punishment in the context of finance has been studied by Egan, Matvos, and Seru (2019b) in the context of financial advisors. For a sample of financial advisors from the BrokerCheck database, they find substantial differences in the punishment of misconduct across genders with female advisors being punished more severely. However, one of the assumptions behind our model is that the SEC punishments are gender-neutral. Therefore, in this section, we both establish the relevance of gender to SEC punishment choices and test for evidence of gender-based discrimination in SEC punishment outcomes.

We, therefore, explore the role of gender in SEC punishments in the next section.

[21] See Chesney-Lind (2002) and Steffensmeier et al. (2005) for evidence on assaults, and Gavrilova and Campaniello (2015) for evidence on property crimes.

[22] Croson and Gneezy (2009) use economic experiments to show that women are more risk averse than men and that social preferences of women are more situationally specific than those of men; women are neither more nor less socially oriented, but their social preferences are more malleable. Bertrand, Goldin, and Katz (2010) show that the growth in the gender gap among graduates of a prestigious MBA program can be explained almost entirely by differences in hours worked, which can, in turn, be explained by child-rearing. Gallen (2015) finds in a sample of Danish workers that mothers are less productive than other women or men, which explains most of the wage difference. Cook et al. (2019) find that the earnings gap among Uber drivers can be explained by men being more experienced on the Uber platform than women, men choosing different routes and work hours than women, and, finally, men having different preferences for driving speed than women. Bolotnyy and Emanuel (2019) find that women make less than men at a large public, unionized employer since women are less likely than men to game the scheduling system by trading off work hours at regular wages for overtime hours at premium wages.

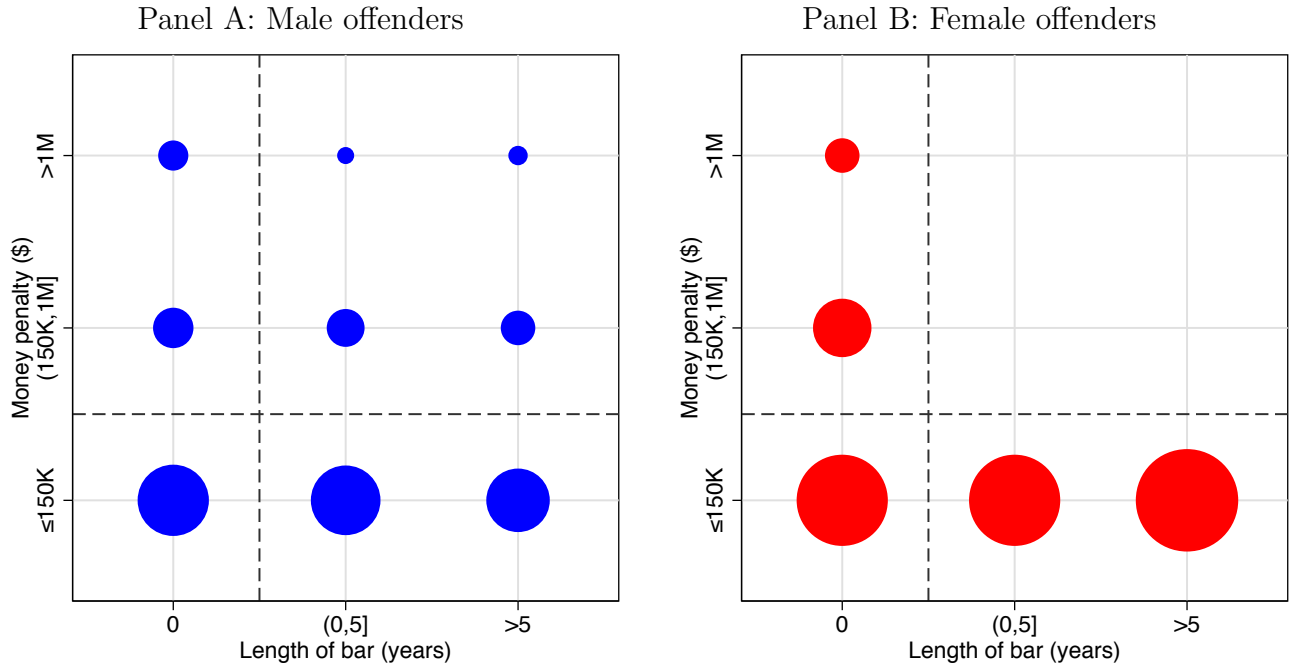


Figure 2: Combinations of monetary penalty and bars in SEC enforcement cases

The figure shows the combinations of the length of the bar on the horizontal axis and monetary penalty on the vertical axis imposed on male offenders (Panel A) and, respectively, female offenders (Panel B). The size of each circle represents the fraction of offenders. No circle indicates that the combination does not exist in the data. the dashed lines indicate a positive bar term and, respectively, a monetary penalty above $150K, which is the largest minimum per violation monetary penalty (until 2013).

4 Role of Gender in SEC Punishments

To motivate our theoretical model in Section 5, we document stylized facts on the role of gender in SEC punishments. To start, Figure 2 illustrates the unconditional composition of penalties imposed on individual male (left panel) and female (right panel) offenders. Each plot has the total value of monetary penalties on the vertical axis and the professional bar length on the horizontal axis. The size of each circle represents the fraction of offenders. No circle indicates that the combination does not exist in the data. Dashed lines indicate a positive professional bar term and, respectively, a monetary penalty above the maximum mandatory monetary penalty of $150K.[23] Women receive longer bars and smaller monetary penalties than men. These male/female differences are also present conditional on the type of offense. Figure 2 further shows that, strikingly, women exclusively receive either monetary penalties or professional bars, while some men receive both penalties. In the rest of this section, we investigate gender-sorted descriptive statistics of the SEC punishments and then explore gender-based discrimination as a possible explanation for our findings.

[23]Mandatory monetary penalties apply to "each act or omission" violating the securities laws. Depending on the nature and severity of the violation, they range per violation from $0 to $150,000 (until 2013) for individuals. Bars include cease and desist orders, suspension or revocation of broker-dealer and investment advisor registrations, censures, and bars from association with the securities industry.

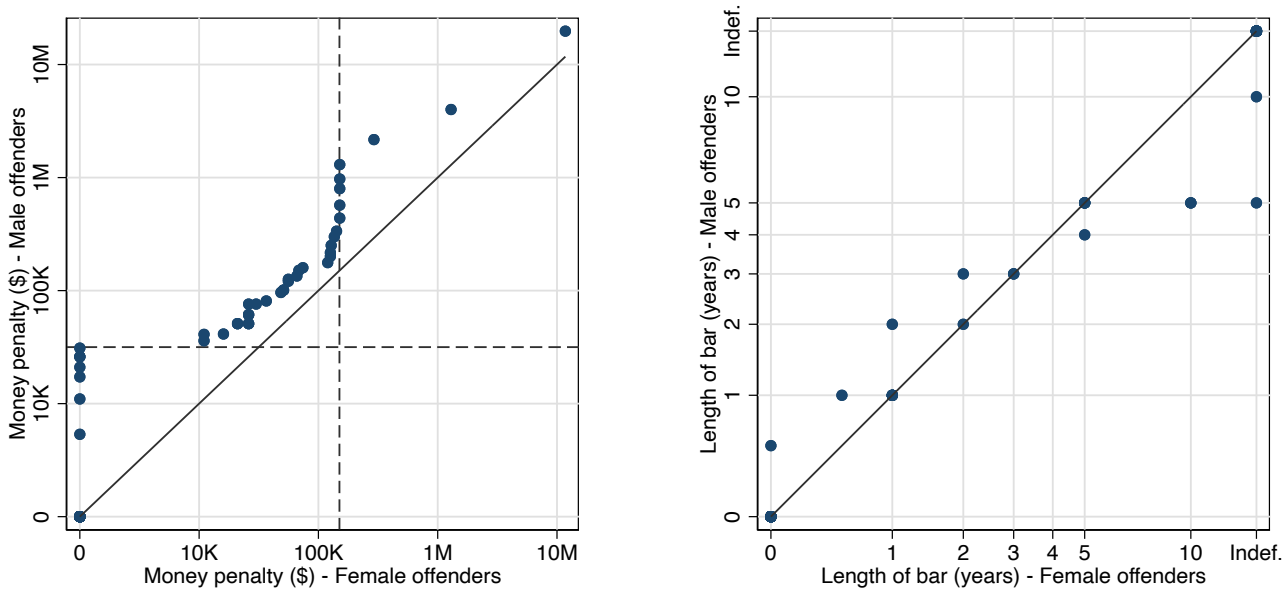


Figure 3: Q–Q plots of monetary penalty and bar length

The figure presents Q–Q plots of ordered monetary penalties (left) and professional bar lengths (right) for male (vertical) versus female (horizontal) offenders. In both plots a value above (below) the 45-degree line represents a higher likelihood of a given penalty for male (female) offenders. The dashed line in the left plot indicates a $150K penalty.

4.1 Gender-sorted statistics on SEC punishments

Distributions of penalties. We start with a statistical analysis of the SEC penalties partitioned by the offender's gender. Figure 3 presents Q–Q plots of ordered monetary penalties (left) and professional bar lengths (right) for male (vertical) versus female (horizontal) offenders. In both subplots a value above (below) the 45-degree line represents a higher likelihood of a given penalty for male (female) offenders. The dashed vertical line in the left subplot indicates a $150K penalty. The left subplot clearly shows that male offenders are more likely to receive a monetary penalty. Bunching along the vertical line at zero indicates that female offenders are unlikely to be penalized up to $10K. The data point at $10M is almost on the 45-degree line thus indicating that men and women are almost equally likely to receive very high monetary penalties.

The right subplot of Figure 3 paints a quite different picture. Male and female offenders are equally likely to receive professional bars up to 5 years in length. However, female offenders are significantly more likely than male offenders to receive professional bars longer than five years, including ten-year-long and indefinite bars. Overall, Figure 3 suggests gender-based heterogeneity in the SEC punishments.

Table 2 presents gender-sorted sample statistics. Panel A documents the distribution of SEC penalties by the offender's gender unconditionally and conditional on the penalty being nonzero. Out of 376 offenders who received a monetary penalty 342 (91%) are male and 34 (9%) are female. monetary penalties vary with gender. Unconditionally/conditionally males pay on aver-

Table 2: SEC punishments: Distributional statistics and tests by offender gender

The table documents the distribution of SEC punishments by offender's gender. Indefinite bars are coded with a length of 15 years. p-values are reported in square brackets.

	Gender	N	Mean	SD	Min	10%	25%	Median	75%	90%	Max
Panel A: *Distribution by offender gender*											
Monetary penalty ($K)	M	579	592	3,781	0	0	0	30	125	496	60,000
	F	69	226	1,417	0	0	0	0	55	150	11,752
Money cond. ($K)	M	342	1,002	4,880	2	25	50	100	265	1,049	60,000
	F	34	458	2,007	10	20	25	60	141	150	11,752
Length of bar (yrs)	M	579	4.25	5.99	0	0	0	0.5	5	15	15
	F	69	4.57	6.35	0	0	0	0	10	15	15
Length of bar cond.	M	297	8.29	6.05	0.08	1	3	5	15	15	15
	F	34	9.28	6.16	0.5	1	3	12.5	15	15	15

Panel B: *Kolmogorov-Smirnov distributional tests*

	Raw			Demeaned			Log-demeaned		
	M<F	F<M	K-S	M<F	F<M	K-S	M<F	F<M	K-S
monetary penalty ($K)	0.001	-0.174	0.174	0.879	-0.057	0.879	0.128	-0.160	0.160
	[1.00]	[0.02]	[0.04]	[0.00]	[0.67]	[0.00]	[0.36]	[0.20]	[0.36]
Money cond. ($K)	0.026	-0.280	0.280	0.839	-0.070	0.839	0.128	-0.160	0.160
	[0.96]	[0.01]	[0.01]	[0.00]	[0.74]	[0.00]	[0.36]	[0.20]	[0.36]
Length of bar (yrs)	0.041	-0.020	0.041	0.041	-0.507	0.507	0.101	-0.424	0.424
	[0.82]	[0.95]	[1.00]	[0.82]	[0.00]	[0.00]	[0.54]	[0.00]	[0.00]
Length of bar cond.	0.101	-0.003	0.101	0.101	-0.424	0.424	0.101	-0.424	0.424
	[0.54]	[1.00]	[0.88]	[0.54]	[0.00]	[0.00]	[0.54]	[0.00]	[0.00]

age $592K/$1,002K in penalties, while females pay less than half that on average. The standard deviation, median, 75% and 90% quantiles, and maximum fine are all smaller for women, both conditionally and unconditionally.

Out of 331 offenders who received professional bars 297 (90%) are male and 34 (10%) are female. The summary statistics in the table show that the average bar length is 4.25 years for men and 4.57 for women.[24] However, the 75% quantile is 5 years for men and 10 years for women. Conditional on receiving a bar, women receive 9.28 years (12.5 years) on average (median) and men only 8.29 (5) years. In summary, female offenders receive lower monetary penalties than male offenders, but longer bars.

Next, we use the two-sample Kolmogorov-Smirnov distance test to determine if there are statistically significant differences in the distributions of monetary penalties and professional bars between male and female offenders. The Kolmogorov-Smirnov distance is the maximum absolute difference between the two cumulative distribution functions and is invariant to reparametrizations, including

[24]Indefinite bars are coded with a length of 15 years, as the maximum finite bar in the data is 10 years. Our results are robust to alternative specifications of 20, 25, and 50 years.

demeaning and log transformation. Panel B of Table 2 documents the results for the raw (Columns 1 to 3), demeaned (Columns 4 to 6), and demeaned and log-transformed samples. We test the hypothesis that penalties for males take smaller values, i.e., smaller monetary penalties and shorter bars, than for females in Columns 1, 4, and 7. The reverse hypothesis is tested in Columns 2, 5, and 8. Columns 3, 6, and 9 report the Kolmogorov-Smirnov distance test.

Rows 1 (all offenders) and 2 (offenders with non-zero monetary penalties) of Panel B report Kolmogorov-Smirnov tests for the distribution of monetary penalties. For all offenders, the largest difference between the raw distribution functions under the hypothesis that penalties for males take smaller values is 0.001 (Column 1) with a p-value equal to 1.00, which is not significant. The largest difference between the raw distribution functions under the hypothesis that monetary penalties for males take larger values than for females (Column 2) is equal to -0.174, which is statistically significant. The combined difference reported in the third column is 0.174 and it is significantly different from zero with the p-value equal to 0.04. For demeaned distributions, the largest difference between distribution functions under the hypothesis that penalties for males(females) take smaller values is equal to 0.879(-0.057) with a p-value equal to 0.00(0.67). The combined difference reported in the sixth column is 0.879 and it is significantly different from zero with a p-value equal to 0.00. However, for the log-demeaned distributions, the largest difference between distribution functions reported in Column 9 is equal to 0.160 with a p-value equal to 0.36. The results for offenders with non-zero monetary penalties are quite similar.

Rows 3 (all offenders) and 4 (offenders with non-zero bars) of Panel B report Kolmogorov-Smirnov tests for the distribution of bar length. For all offenders, the largest difference between the raw distribution functions under the hypothesis that males get shorter bars is 0.041 (Column 1) with a p-value equal to 0.82. The largest difference between the raw distribution functions under the hypothesis that females get shorter bars (Column 2) is -0.020 with a p-value equal to 0.95. The combined difference reported in the third column is equal to 0.041 with a p-value equal to 1.00. For demeaned distributions, the largest difference between distribution functions under the hypothesis that bars are shorter for males(females) is equal to 0.041(-0.507) with a p-value equal to 0.82(0.00). The combined difference reported in the sixth column is 0.507 and it is significantly different from zero with a p-value equal to 0.00. For the log-demeaned distributions, the largest difference between distribution functions reported in Column 9 is equal to 0.424 with a p-value equal to 0.00. The results for offenders with non-zero monetary penalties are quite similar. These results indicate that, while the distributions of raw bar length are not statistically different between male and female offenders, both the demeaned and log-demeaned distributions in bar length are statistically different.

Finally, as a direct test of gender relevance to the SEC punishments, we sort punishment bundles consisting of monetary penalties and professional bars on the offender's gender. Table 3 documents the frequency of all possible combinations of monetary penalty and length of bar imposed on male (Panel A) and female (Panel B) offenders. monetary penalties are reported across rows, split into

Table 3: Combinations of monetary penalty and professional bars

The table documents the combinations of the length of bar (rows) and monetary penalty (columns) imposed on male (panel A) and female (Panel B) offenders. The numbers represent the fraction of offenders.

		Split by length of bar (yrs)		
	Total	0	(0–5]	>5
Panel A: *Male offenders*				
Fraction of offenders	100.0%	48.7%	27.8%	23.5%
Split by monetary penalty ($):				
≤$150K	76.5%	38.3%	20.9%	17.3%
($150K–$1M]	17.4%	6.7%	5.9%	4.8%
>$1M	6.0%	3.6%	1.0%	1.4%
Panel B: *Female offenders*				
Fraction of offenders	100.0%	50.7%	21.7%	27.5%
Split by monetary penalty ($):				
≤$150K	88.4%	39.1%	21.7%	27.5%
($150K–$1M]	8.7%	8.7%	–	–
>$1M	2.9%	2.9%	–	–

$0-$150K, ($150K–$1M], >$1M. Professional bars are reported across columns, split into 0, (0–5], and > 5 years. The reported numbers represent the percentage of offenders.

Male, 48.7%, and female, 50.7%, offenders are almost equally likely to receive no professional bar. Within the group of offenders without professional bars, 38.3% of male and 39.1% of female offenders receive a monetary penalty no greater than $150K, which is the maximum "minimum" monetary penalty. 3.6% of male and 2.9% of female offenders receive no professional bars but pay more than a million dollars in penalties. In fact, only female offenders who do not receive a professional bar pay more than $1M in monetary penalties, while 2.4% of male offenders pay more than $1M in monetary penalties and receive some type of professional bar.

27.8% (23.5%) of male and 21.7% (27.5%) of female offenders have been barred for no longer (longer) than five years. The most striking feature of gender-sorted punishment bundles is that *all barred* female offenders paid no greater than $150K in monetary penalties. By way of contrast, barred male offenders are represented in all monetary penalty buckets. In summary, Table 3 quantifies the evidence from Figure 2 that the offender's gender is correlated with the choice of SEC punishment bundle. Next, we investigate monetary penalties at a more granular level.

Composition of monetary penalties. It is possible that total monetary penalties differ between female and male offenders not because female offenders' demand for them is less than male offenders' demand, but simply because of composition effects. As discussed in Appendix 1, civil monetary penalties as well as disgorgements and prejudgment interest together form the total monetary penalty for an offender. Civil monetary penalties are punitive fines imposed by the SEC. They constitute the main direct monetary punishment imposed on a securities law offender. The SEC

Table 4: Differences in types of monetary penalties between female and male offenders

The table documents the characteristics of offenders in SEC trial cases. The sample consists of all offenders in each legal case against individuals in the SEED database between 2003 and 2018. The number of individual cases/offenders is 574. The total number of civil and administrative proceedings is 648. Standard errors are clustered at the legal case. Significance levels are * 10%, ** 5%, *** 1%.

	Female	Male	Female – Male
Panel A: *All filings*			
Total monetary penalty ($K)	246.52	681.94***	−435.42*
Civil penalty ($K)	86.42	237.27***	−150.85*
Disgorgement and interest ($K)	160.10	444.67***	−284.57*
Panel B: *Civil filings*			
Total monetary penalty ($K)	231.02	427.14***	−196.12
Civil penalty ($K)	73.00	113.25***	−40.25
Disgorgement and interest ($K)	158.02	313.89**	−155.87
Panel C: *Administrative filings*			
Total monetary penalty ($K)	15.50***	254.80*	−239.30*
Civil penalty ($K)	13.42***	124.02*	−110.60
Disgorgement and interest ($K)	2.08	130.78*	−128.70*

may also seek the return of illegal profits as disgorgements and prejudgment interest. Therefore, it is possible that male offenders pay more in disgorgements, which can be quite large, than female offenders who mostly pay punitive fines.

Table 4 documents that the differences between female and male offenders exist within all types of monetary penalties. It is the case that male offenders need to disgorge more illicit profits than female offenders and, in addition, pay larger civil fines. Both civil penalties and disgorgements are lower for female than male offenders, and this is true across all filing types (results are reported in the first panel) as well as separately for civil filings (results are reported in the second panel) and for administrative filings (results are reported in the third panel).

Characteristics of SEC enforcement cases sorted on offenders' gender. It is well known that occupations and labor market outcomes are different for men and women. Some of our unconditional results may, therefore, be explained by systematic differences in observable characteristics that correlate with punishment outcomes. The type of allegation, nature, and severity of crime, job position, and other factors all determine punishment outcomes and, at the same time, they may differ across gender groups. We, therefore, start by documenting various characteristics of SEC enforcement cases and how they vary between female and male offenders.

Table A.1 in the Appendix reports the characteristics of offenders in SEC trial cases. The sample consists of all offenders in each legal case against individuals in the SEED database between 2003 and 2018. The total number of civil and administrative proceedings is 648. The number of individual cases/offenders is 574. The first/second column reports the fraction of female/male

offenders with the feature indicated in the row header. t-tests check if the fraction is different from zero. The third column reports differences in characteristics of the SEC enforcement cases between female and male offenders. Here, t-tests check if the difference is statistically significant. All reported standard errors are clustered at the legal case.

Across panels in Table A.1, we sort case characteristics into allegation type (Panel A), filing format (administrative or civil proceeding, or both) and number of offenders (Panel B), alleged violations of Exchange Act and Securities Act (Panel C), job position at the time of violation (Panel D), and court's state (Panel E). Table A.1 shows that male and female offenders vary systematically in their characteristics. Many of the differences are, however, not statistically significant. For instance, issuer reporting and disclosure issues are the most frequent allegation type. Females face this allegation 58% of the time and men 53% of the time. Yet, the 5 percentage point difference is not statistically different. Females are more likely to commit crimes related to issuer reporting and disclosure, market manipulation, municipal bonds and public pensions, and others. By way of contrast, females are less likely to commit crimes related to broker-dealer and insider trading, investment advisory, securities offering, and the Foreign Corrupt Practices (FCP) Act. The filing format and number of offenders vary very slightly across genders. Exchange Act violations vary systematically and statistically significantly across female and male offenders. By contrast, Securities Act violations do not vary across genders. Overall, it is not apparent if these differences are economically material and how they could affect our results.

Panel D presents gender differences in job positions. Note that offenders may fall into multiple job categories during the violation period so that the rows do not necessarily sum to one. We find that females are less often in a founder/owner position (2% versus 5%), though the difference is not statistically significant. This could be because the difference is immaterial or because we lack statistical power due to the small population size of the SEC enforcement cases. There are many fewer female than male CEOs in our sample. Here the difference is significant. They are also less represented than men in other high-ranking positions such as chairman, head of a division or unit, president, and vice president, as well as in not-so-high-ranking capacities as the associate and broker-dealer/specialist. Women, however, are relatively more often than men employed as a CFO, Chief Officer, director, and manager. Overall, it is not clear that in our sample women are systematically employed in lower-ranked jobs than men during their allegation period, with the exception of the CEO–CFO/CO divide.

4.2 Evidence on discrimination?

Gender does not enter the total punishment constraint in our model. However, our findings so far indicate that male and female offenders receive different punishment bundles. Specifically, male offenders receive a variety of combinations of monetary penalties and professional bars, ranging from a small fine and no bar to a large fine and indefinite bar. Female offenders often receive a

Panel A: Q–Q plot of total punishment = monetary penalty + length of bar $*$ \$150,000

Panel B: Q–Q plot of total punishment = monetary penalty + length of bar $*$ \$250,000

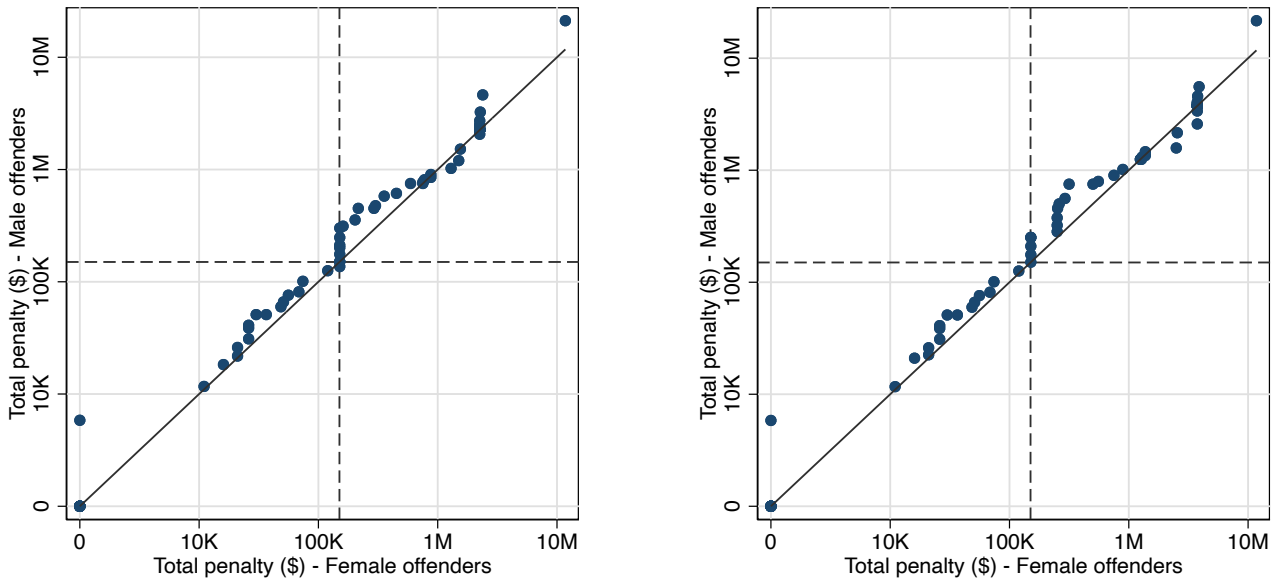


Figure 4: Distribution of total penalties for female vs. male offenders

The figure uses Q–Q plots to compare distributions of the total punishment for male (vertical axis) versus female (horizontal axis) offenders. Values above the 45-degree line indicate a higher (lower) likelihood of penalties depicted on the vertical axis than penalties depicted on the horizontal axis. The dashed line indicates a \$150K penalty.

small fine with a long-term bar or a significant fine without a bar. But they never receive a medium or large fine with a medium or long professional bar. These outcomes could be due to gender-based discrimination. Here we investigate whether the gender neutrality of the total punishment still holds using univariate analysis as well as multivariate regressions to control for heterogeneity with a host of case-specific and offender-specific characteristics.

Total punishment. We start by computing proxies for the total punishment by monetizing professional bars at a rate of \$150K per year and, for robustness, at a rate of \$250K per year and adding them to monetary penalties.[25] These numbers lie within the range of estimates that we obtain in Section 5.3. Figure 4 uses Q–Q plots to compare distributions of the total punishment for male (vertical axis) versus female (horizontal axis) offenders.[26] Panel A(B) graphs the total punishment computed by monetizing professional bars at a rate of \$150K(\$250K) per year. Both plots clearly show that while the mixture of penalties varies between female and male offenders, the distribution of *total* penalty is similar between genders.

We next investigate the relation between the total punishment and the offender's gender using

[25] Our results are robust to more extreme values if \$100,000 or \$500,000 are used to monetize professional bars.

[26] Just like in Figure 2 dashed lines indicate a monetary penalty below/above \$150K.

Table 5: Determinants of total punishments

The table documents the determinants of total penalties. We compute total penalties by monetizing professional bars at a rate of $150,000 (Panel A) or $250,000 (Panel B) per year and adding them to monetary penalties. Coefficient estimates are obtained from linear regressions including individuals with zero total penalties (columns 1 and 2) and excluding individuals with zero total penalties (columns 3 to 6). Across columns, the specifications control for fixed effects from the 8 allegation types, 3 filing formats, 10 offender counts, 27 violations alleged, 13 job positions, 37 court districts, and 6 offender name etymologies all described in Appendix A. The number of observations with positive total penalties is 541. Standard errors reported in parenthesis are bootstrapped, clustered at the legal case, and stratified at the gender level. Significance levels are * 10%, ** 5%, *** 1%.

	Total punishment (cum 0)		Total punishment (ex 0)		log(Total punishment)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: *Total punishment @ $150,000*					
Female	-317.84	-195.01	-367.23	-332.36	-0.15	-0.27
	(259.89)	(354.13)	(309.43)	(418.99)	(0.28)	(0.25)
R^2	0.001	0.145	0.001	0.189	0.001	0.495
	Panel B: *Total punishment @ $250,000*					
Female	-285.75	-225.24	-322.33	-337.48	-0.13	-0.29
	(315.91)	(380.91)	(368.15)	(447.10)	(0.31)	(0.27)
R^2	0.000	0.162	0.001	0.212	0.000	0.496
Fixed Effects	N	Y	N	Y	N	Y
N	648	648	541	541	541	541

the following multivariate specifications:

$$\begin{aligned}
&\text{Total punishment} \geq 0: && (\text{Total punishment} \geq 0)_{ijt} && = \beta_0 + \beta_1 \cdot \text{Female}_{ijt} + \beta_2 \boldsymbol{X}_{ijt} + \varepsilon_{ijt}, \\
&\text{Total punishment} > 0: && (\text{Total punishment} > 0)_{ijt} && = \beta_0 + \beta_1 \cdot \text{Female}_{ijt} + \beta_2 \boldsymbol{X}_{ijt} + \varepsilon_{ijt}, \\
&\text{Log-total punishment}: && \log(\text{Total punishment})_{ijt} && = \beta_0 + \beta_1 \cdot \text{Female}_{ijt} + \beta_2 \boldsymbol{X}_{ijt} + \varepsilon_{ijt}.
\end{aligned} \tag{11}$$

The dependent variable $(\text{Total punishment} \geq 0)_{ijt}$ is the total punishment for an offender i in proceeding j at time t including offenders with zero total punishment. The dependent variable $(\text{Total punishment} > 0)_{ijt}$ excludes offenders with zero total punishment. Specification (11) uses as the dependent variable the natural logarithm of the total punishment for cases where total punishment is non-zero. The explanatory variable of interest is the gender of the offender, Female_{ijt}. We control for offender characteristics in $\boldsymbol{X}_{ijt}$ and include across specifications fixed effects for allegation type, filing format, offenders' job positions, court districts, and offenders' name etymology. We cluster standard errors at the legal case.

Table 5 presents our findings. Panel A(B) reports results for the total punishment computed by monetizing professional bars at a rate of $150K($250K) per year. Columns 1 (without fixed effects) and 2 (with fixed effects) report results for the first Probit specification in (11). Columns 3 (without fixed effects) and 4 (with fixed effects) report results for the second Probit specification in (11). Finally, Columns 5 (without fixed effects) and 6 (with fixed effects) present regression

results for specification (11). Table 5 shows that all estimated coefficients on the offender's gender dummy, Female_{ijt}, are negative, demonstrating that, on average, female offenders receive lower total penalties than male offenders, although none of the estimates are statistically significant.

Role of the judge. Next, we examine the possibility that all else being equal, female offenders are treated differently than male offenders by either administrative or federal judges or by both. It is quite likely that a judge's gender strongly affects the type and severity of the punishment even more so for female offenders. We therefore investigate the retrospective relationship between the judge's gender and punishment types. We estimate discrete choice regressions for punishment types using the following specification:

$$\begin{aligned}(\text{Punishment Type})_{ijt} = \beta_1 \text{Offender Female}_{ijt} + \beta_2 \text{Judge Female}_{ijt} \\ + \beta_3 (\text{Offender Female \& Judge Female})_{ijt} + \beta_4 X_{ijt} + \varepsilon_{ijt}. \quad (12)\end{aligned}$$

The dependent variable $(\text{Punishment Type})_{ijt}$ is a dummy variable taking the value of one if the punishment for a proceeding i for offender j at time t is equal to a given type, and zero otherwise. $\text{Type} \in \mathbb{S}$ is an element of a set of different punishments, $\mathbb{S}$. We start by considering a coarse set of four punishment bundles, $\mathbb{S} = \{\text{No penalty}, \text{Money only}, \text{Bar only}, \text{Money and Bar}\}$. The explanatory variables are the gender of the offender, $\text{Offender Female}_{ijt}$, the gender of the judge, $\text{Judge Female}_{ijt}$, and a dummy equal to one if both offender and judge are female and zero otherwise, $(\text{Offender Female \& Judge Female})_{ijt}$. To control for heterogeneity, we include in (12) the same fixed effects, except punishment type fixed effect, as used in specifications (11). We also cluster standard errors at the legal case level.

Table 6 reports our findings. Columns correspond to different punishment bundle types, $\text{Type} \in \{\text{No penalty}, \text{Money only}, \text{Bar only}, \text{Money and Bar}\}$, and per each punishment type we report the estimate obtained without and with fixed effects. Panel A pools all proceedings and for results reported in this panel we add the filing format fixed effect to specification (12). Panels B and C limit our estimations to civil and administrative filings, respectively.

Results from all three panels confirm that female offenders receive both a monetary penalty and a professional bar less often than male offenders. They also confirm that female offenders are more likely to receive either a money-only or a professional bar-only penalty than male offenders. They further show that female judges are more likely to impose penalties than male judges. Female judges more often than male judges impose a monetary penalty only and more often impose a professional bar only, though the latter is not statistically significant. In turn, female judges less often than male judges impose both a monetary penalty and a professional bar. Female administrative and federal judges are more likely to impose the professional bars-only penalty than corresponding male judges, with female ALJs more so. Female administrative and federal judges are also more likely to impose the money-only penalty than corresponding male judges, with female federal judges more

Table 6: Sanctions and judges' gender

The table documents the determinants of the punishments imposed and how they depend on the offender's gender and the gender of the judge. Coefficient estimates are obtained from a Probit regression. Across columns, the specifications control for fixed effects from the 8 allegation types, 27 violations alleged, 13 job positions, 37 court districts, and 10 offender counts described in Appendix A. Standard errors clustered at the legal case are reported in parenthesis. Significance levels are * 10%, ** 5%, *** 1%.

	Punishment type							
	No penalty		Money only		Bar only		Money and bar	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: *All filings (probit)*								
Offender female	0.02	0.27	0.16	0.32	0.16	0.07	-0.39*	-0.39
	(0.20)	(0.29)	(0.22)	(0.24)	(0.19)	(0.25)	(0.21)	(0.26)
Judge female	-0.82**	-1.52***	0.53***	0.47*	0.25	0.48*	-0.52**	-0.58**
	(0.36)	(0.51)	(0.21)	(0.24)	(0.22)	(0.29)	(0.23)	(0.27)
Offender and judge female	0.43	1.35	-1.00*	-0.96*	0.56	-0.11	0.19	0.34
	(0.67)	(0.92)	(0.54)	(0.57)	(0.48)	(0.60)	(0.58)	(0.58)
Pseudo R^2	0.021	0.362	0.015	0.298	0.011	0.282	0.017	0.231
Fixed Effects	N	Y	N	Y	N	Y	N	Y
N	648	519	648	567	648	474	648	567
Panel B: *Civil filings (probit)*								
Offender female	-0.06	0.44	0.44	1.44***	0.21	0.40	-0.88**	-3.53***
	(0.28)	(0.45)	(0.30)	(0.48)	(0.31)	(0.82)	(0.38)	(1.08)
Judge female	-1.11**	-2.49***	0.74***	1.45***	0.18	-0.25	-0.39	-0.93*
	(0.48)	(0.66)	(0.28)	(0.43)	(0.38)	(0.91)	(0.27)	(0.56)
Offender and judge female	0.00	0.00	-1.53**	-2.89***	0.89	-2.00	1.03	4.31***
	(.)	(.)	(0.77)	(0.85)	(0.70)	(1.69)	(0.76)	(1.50)
Pseudo R^2	0.048	0.440	0.040	0.479	0.020	0.532	0.028	0.591
Fixed Effects	N	Y	N	Y	N	Y	N	Y
N	295	183	300	219	300	98	300	218
Panel C: *Administrative filings (probit)*								
Offender female	0.05	0.07	-0.16	-0.15	0.20	0.07	-0.09	0.04
	(0.29)	(0.46)	(0.29)	(0.35)	(0.25)	(0.31)	(0.26)	(0.32)
Judge female	-0.53	-0.04	-0.04	-0.20	0.77**	0.67	-0.80	-1.44**
	(0.48)	(0.36)	(0.33)	(0.44)	(0.33)	(0.42)	(0.53)	(0.65)
Offender and judge female	0.80	1.20	-0.08	0.49	-0.17	-0.98	0.00	0.00
	(0.83)	(0.89)	(0.77)	(0.84)	(0.70)	(0.86)	(.)	(.)
Pseudo R^2	0.007	0.366	0.001	0.320	0.022	0.344	0.013	0.270
Fixed Effects	N	Y	N	Y	N	Y	N	Y
N	348	275	348	309	348	289	343	311

so. Female administrative and federal judges impose fewer monetary and bar penalties than male judges, with a smaller likelihood of belonging to female ALJs.

When it comes to female judges imposing differential punishments on same-gender offenders, the evidence is mixed. Female federal and administrative judges both impose significantly fewer money-only penalties on women compared to men. Both types of female judges impose, in turn,

Table 7: Sanctions imposed by female versus male judges

The table documents the determinants of the punishments imposed. Coefficient estimates are obtained from a Probit regression. Across columns, the specifications control for fixed effects from the 8 allegation types, 27 violations alleged, 13 job positions, 37 court districts, and 10 offender counts described in Appendix A. Standard errors clustered at the legal case are reported in parenthesis. Significance levels are * 10%, ** 5%, *** 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	No penalty	Money penalty	Large money	Small money	Bar	Long bar	Short bar
Panel A: *All filings (probit)*							
Offender female	0.27	-0.01	-1.25***	0.45**	-0.35*	-0.52**	0.11
	(0.29)	(0.21)	(0.35)	(0.23)	(0.21)	(0.23)	(0.34)
Judge female	-1.52***	0.10	-0.44	0.33	-0.14	-0.26	0.45
	(0.51)	(0.26)	(0.29)	(0.25)	(0.24)	(0.24)	(0.41)
Offender and judge female	1.35	-0.70	0.00	-0.67	0.67	1.12**	0.00
	(0.92)	(0.61)	(.)	(0.64)	(0.50)	(0.55)	(.)
Pseudo R^2	0.362	0.242	0.297	0.202	0.255	0.255	0.304
Fixed Effects	Y	Y	Y	Y	Y	Y	Y
N	519	566	535	553	579	577	268
Panel B: *Civil filings (probit)*							
Offender female	0.44	-0.18	-1.09**	0.11	-2.08***	-2.08***	NA
	(0.45)	(0.39)	(0.47)	(0.50)	(0.57)	(0.57)	NA
Judge female	-2.49***	1.11***	0.20	0.52	-0.69	-0.69	NA
	(0.66)	(0.41)	(0.42)	(0.39)	(0.60)	(0.60)	NA
Offender and judge female	0.00	-1.45	0.00	1.69*	3.42***	3.42***	NA
	(.)	(1.00)	(.)	(1.01)	(0.92)	(0.92)	NA
Pseudo R^2	0.440	0.402	0.368	0.399	0.556	0.556	NA
Fixed Effects	Y	Y	Y	Y	Y	Y	NA
N	183	217	196	199	243	243	0
Panel C: *Administrative filings (probit)*							
Offender female	0.07	0.04	NA	0.32	0.25	-0.02	0.11
	(0.46)	(0.29)	NA	(0.28)	(0.33)	(0.30)	(0.34)
Judge female	-0.04	-0.87**	NA	-0.06	0.05	-0.26	0.45
	(0.36)	(0.44)	NA	(0.41)	(0.41)	(0.37)	(0.41)
Offender and judge female	1.20	0.57	NA	-0.39	-0.95	0.24	0.00
	(0.89)	(0.91)	NA	(0.88)	(0.77)	(0.79)	(.)
Pseudo R^2	0.366	0.293	NA	0.186	0.259	0.219	0.304
Fixed Effects	Y	Y	NA	Y	Y	Y	Y
N	275	324	4	320	310	316	268

more bars on women compared to men, but the difference is not statistically significant due to federal judges.

Next, we check whether our findings from Table 6 are robust to more refined types of punishments. We drop the "Money and bar" type and add two extreme punishments to both monetary penalty, "Large money" and "Small money", and administrative bars, "Long bar" and "Short bar", for a total 7 types of punishments, $\mathbb{S} = \{\text{No penalty}, \text{Money only}, \text{Large money}, \text{Small money},$

Bar only, Long bar, Short bar}. We define a large(small) monetary penalty if it is in the top(bottom) 25th percentile of the monetary penalty distribution. Long(short) bars are defined analogously. Since the types of punishments available between federal and administrative venues do not overlap, we have that short bars are imposed exclusively in administrative proceedings, while large monetary penalties are imposed exclusively in the federal court.

Table 7 reports our findings. It confirms that male judges do not impose very different punishments on female than male offenders. The refined punishment splits show, however, that female judges impose significantly more long-term bars beyond two years on female than male offenders. In summary, we do not find conclusive evidence of discrimination against female offenders neither by federal nor administrative judges.

This section establishes that female and male offenders receive different punishment bundles. Female offenders tend to have either long professional bars and a minimal monetary penalty or no professional bars and an above minimum monetary penalty. Some male offenders go for a combination of professional bars and monetary penalties. We do not find evidence of gender-based discrimination in SEC punishments. Therefore, to understand the heterogeneity in the composition of male and female punishment bundles, we extend our model in the next section by incorporating gender into the offender's utility and then estimate the extended model in the data. Once estimated, the model can be used for counterfactual policy analysis.

5 Becker (1968) meets Akerlof and Kranton (2000)

Because the baseline model of offender behavior considered in Section 3 does not address the gender differences in punishments and does not match the corners well, we incorporate the offender's gender by using the insight of Akerlof and Kranton (2000). Akerlof and Kranton integrate an agent's identity into an economic model of behavior by proposing that an agent's identity is associated with different social categories. Conventional consumer theory suggests that agents' behavior and choices differ across these social categories, thus affecting agents' utilities. Specifically, we assume that professional bars are associated with costs that we refer to as social stigma. These costs can come from expected future statistical discrimination against offenders in the labor market.

5.1 Extended model

Let $\bar{b} \in \mathcal{P}^F$ be the threshold at which social stigma arises. Beyond $\bar{b}$, professional bars generate a discontinuous disutility $\lambda \geq 0$ in addition to the conventional disutility $U(m, b)$ introduced in Section 3. Discontinuity in disutility is a parsimonious way to generate money-only and bar-only punishments, which are prevalent in the data.[27] To simplify the discussion, we focus on more

[27] While there is substantial evidence in the literature to suggest social stigma, it is not possible to rule out other explanations in the data.

significant offenses by assuming that $I > \overline{m} + \gamma\overline{b}$, which implies that the severity of the misconduct is such that it is not feasible for the offender to escape with minimum monetary fine and without incurring a social stigma, $(\overline{m}, \overline{b}) \notin \mathcal{P}^F$. The offender's optimal punishment bundle, $(\widehat{m}, \widehat{b})$, solves

$$(\widehat{m}, \widehat{b}) = \underset{(b,m)\in\mathcal{P}^F}{\arg\min}\, U(m,b) + \lambda \underbrace{\mathbf{1}\{b > \overline{b}\}}_{\text{Stigma}}. \tag{13}$$

We start by considering a case of $(m^\star, b^\star) \notin \mathcal{P}^F$ implying that the no-stigma optimal monetary penalty is below the minimal monetary penalty, $m^\star < \overline{m}$, and that the no-stigma optimal bar length is longer than the maximum feasible bar length, $b^\star > (I - \overline{m})/\gamma$. This is possible when the misconduct warrants mostly minimum monetary penalty, $\overline{m} \approx I$, or when the total punishment is weak, such that the enforcement agency's punishment threshold I is sufficiently low. In the case of the CES disutility, it follows from equation (5) that $m^\star < \overline{m}$ when α is small.

Since the no-stigma optimal bundle, $(m^\star, b^\star)$, is not feasible, "corner" solutions have to be analyzed. Using relation $I = m + \gamma b$ we eliminate the monetary penalty, m, from the offender's utility to yield $U(I-\gamma b, b)$. $U(I-\gamma b, b)$ monotonically decreases on the interval $b \in [0, \overline{b}]$, then jumps up by the value of λ as b crosses the social stigma threshold, and then once again monotonically decreases on the interval $b \in (\overline{b}, \gamma^{-1}(I - \overline{m})]$. We therefore need to compare $U(I - \gamma\overline{b}, \overline{b})$ and $U(\overline{m}, \gamma^{-1}(I - \overline{m})) + \lambda$. If the stigma disutility is large, then it is optimal to select the shortest feasible bar length that does not lead to stigma and to pay the rest in fines

$$(\widehat{m}, \widehat{b}) = (I - \gamma\overline{b}, \overline{b}), \text{ if } U(I - \gamma\overline{b}, \overline{b}) < U(\overline{m}, \gamma^{-1}(I - \overline{m})) + \lambda. \tag{14}$$

By way of contrast, if the stigma disutility is small, then it is optimal to pay the smallest feasible fine and accept the longest feasible bar length which corresponds to the professional bar corner:

$$f(\widehat{m}, \widehat{b}) = (\overline{m}, \gamma^{-1}(I - \overline{m})), \text{ if } U(I - \gamma\overline{b}, \overline{b}) \geq U(\overline{m}, \gamma^{-1}(I - \overline{m})) + \lambda. \tag{15}$$

Next, we consider the case of $(m^\star, b^\star) \in \mathcal{P}^F$ and once again eliminate the monetary penalty, m, from the offender's utility to yield $U(I - \gamma b, b)$. If the no-stigma optimal bar length is shorter than $\overline{b}$, $b^\star \leq \overline{b}$, then the "interior" solution is optimal:

$$(\widehat{m}, \widehat{b}) = (m^\star, b^\star), \text{ if } b^\star \leq \overline{b}. \tag{16}$$

In this case, the offender has a high tolerance for the professional bar length, making $\overline{b}$ large. Consequently, the offender is willing to trade off money and bar length and selects a portfolio-like punishment bundle.

If the no-stigma optimal bar length is longer than $\overline{b}$, $b^\star > \overline{b}$, then the optimal solution depends on the value of the stigma disutility λ. If λ is large, then, once again, it is optimal to select the

shortest feasible bar length that does not lead to stigma and to pay the rest in fines:

$$(\widehat{m}, \widehat{b}) = (I - \gamma\overline{b}, \overline{b}), \text{ if } U(I - \gamma\overline{b}, \overline{b}) < U(m^\star, b^\star) + \lambda. \tag{17}$$

By way of contrast, if λ is small, then the "interior" solution is optimal:

$$(\widehat{m}, \widehat{b}) = (m^\star, b^\star), \text{ if } U(I - \gamma\overline{b}, \overline{b}) \geq U(m^\star, b^\star) + \lambda. \tag{18}$$

Proposition 1 summarizes these results.

PROPOSITION 1: *The solution to the offender's problem takes the following form*:

$$(\widehat{m}, \widehat{b}) = \begin{cases} (m^\star, b^\star) & \text{if } (m^\star, b^\star) \in \mathcal{P}^F \text{ and } b^\star \leq \overline{b} \text{ or} \\ & \text{if } b^\star > \overline{b} \text{ and } U(I - \gamma\overline{b}, \overline{b}) \geq U(m^\star, b^\star) + \lambda, & \text{(interior)} \\ (I - \gamma\overline{b}, \overline{b}) & \text{if } (m^\star, b^\star) \notin \mathcal{P}^F \text{ and } U(I - \gamma\overline{b}, \overline{b}) < U(\overline{m}, \frac{I-\overline{m}}{\gamma}) + \lambda \text{ or} \\ & \text{if } (m^\star, b^\star) \in \mathcal{P}^F \text{ and } b^\star > \overline{b} \text{ and } U(I - \gamma\overline{b}, \overline{b}) < U(m^\star, b^\star) + \lambda, & \text{(money corner)} \\ (\overline{m}, \frac{I-\overline{m}}{\gamma}) & \text{if } (m^\star, b^\star) \notin \mathcal{P}^F \text{ and } U(I - \gamma\overline{b}, \overline{b}) \geq U(\overline{m}, \frac{I-\overline{m}}{\gamma}) + \lambda. & \text{(bar corner)} \end{cases} \tag{19}$$

The "money corner" is associated with either strong or weak punishments. Under both types of punishment, the net utility gain from selecting a bar length equal to $\overline{b}$ and a high monetary penalty over a bar length longer than $\overline{b}$ and a low monetary penalty greater than λ. It leads to a short bar at the critical non-stigma threshold $\overline{b}$ and a high monetary penalty $I - \overline{b} > \overline{m}$. For example, having any professional bar on the employment record reduces the prospects of highly valuable future employment with a present value equal to λ.

The "bar corner" case corresponds to an environment with either a strong preference for longer bars or misconduct warranting mostly minimum monetary penalty. Female offenders may prefer longer professional bars when they have better outside options and desire to save money. Women also prefer professional bars when they fear future statistical discrimination in the labor market which significantly reduces their future employment opportunities in the field of finance. In this case, the utility gain from selecting the maximum bar length and minimum monetary penalty over the bar length below the social stigma threshold $\overline{b}$ and higher monetary penalty is greater than λ. This leads to a long, potentially indefinite bar, $I - \overline{m} > \overline{b}$, and to a relatively low monetary penalty equal to $\overline{m}$ that does not exceed the offender's budget. For example, λ being low is equivalent to having valuable outside options that do not depend on their criminal history.

The insights from Akerlof and Kranton (2000) help with introducing gender into the model. One difference between men and women is in $\overline{b}$—for women, $\overline{b}$ is lower than for men. In other words, if labor markets discriminate against women who are found guilty of misconduct, then bars are more costly for women. Indeed, Egan, Matvos, and Seru (2019b) find that male financial advisors with a misconduct record are more likely to find future employment than female advisors with the same

record of misconduct. The relationship between the offender's gender and the public assessment of her/his criminal record, e.g., female offenders even with short bars are judged harshly by potential employers, can be driven by gender stereotypes and sexist attitudes towards women. Another difference between male and female offenders can be captured by the social stigma disutility λ. Women may have greater heterogeneity in λ due to greater variability in outside options.

Societal attitudes toward female offenders have been extensively studied by legal scholars. According to the "selective chivalry" argument, female offenders who conform to traditional gender roles are entitled to the protection granted by society in the form of leniency (see Farnworth and Teske 1995; Bickle and Peterson 1991; Spohn and Beichner 2000; Herzog and Oreg 2008). However, "nontraditional" female offenders who do not fit such traditional gender roles, e.g., by being single, careerist, feminist, and/or working in a traditionally male field like finance dominated by the "old boys" network, should receive harsher punishment for the same crime than men (see Johnson and Scheuble 1991; O'Neil 1999; Steury and Frank 1990).[28] Therefore, female offenders in financial crimes may be reluctant to admit any guilt, i.e., they should have a low guilt tolerance threshold $\bar{b}$ because they are afraid to be punished for double deviance: once for the crime they have committed, and once more for departing from what is considered gender-appropriate behavior (e.g., Bickle and Peterson 1991; Steury and Frank 1990).

Social stigma disutility λ and threshold $\bar{b}$ both play a key role in potentially explaining the gender-based dichotomy in punishing bundles observed in the data. Figure 5 illustrates this point. Consider an extreme case of male offenders not being affected by social stigma, $\lambda = 0$, and female offenders being affected by it, $\lambda > 0$. Panel A of Figure 5 shows that when λ is large, female offenders who are strongly affected by stigma are better off selecting the longest professional bar not leading to stigma and fulfilling the rest of the punishment with a monetary penalty. When the social stigma threshold $\bar{b}$ is small, female offenders pay large monetary penalties and have short professional bars. By way of contrast, Panel B of Figure 5 shows that if λ is small, female offenders are better off paying the minimum monetary penalty and having the longest possible bars appropriate for a degree of misconduct measured by I.

While highly stylized, the model explains how monetary penalties and professional bars can vary between female and male offenders and how the combinations of monetary penalties and professional bars can vary between female and male offenders. First, differential options across genders outside the field of finance can translate into systematic gender differences in punishment. Female offenders may have career and/or other options outside finance that are less desirable to men, such as greater childcare responsibility, or having a job with lesser pay but higher personal reward, such as teaching or philanthropy. These outside options are less affected by having professional bars, thus reducing the disutility due to social stigma, λ, (Case 3 in solution (19)). Therefore, consistent with our

[28]The selective chivalry hypothesis has been broadly supported in the legal literature. The existing evidence demonstrates that women who commit domestic violence offenses against other women (Romain and Freiburger, 2016), who commit violent offenses (Rodriguez, Curry, and Lee, 2006), and who have more extensive criminal histories (Tillyer, Hartley, and Ward, 2015) are less likely to receive lenient sentences.

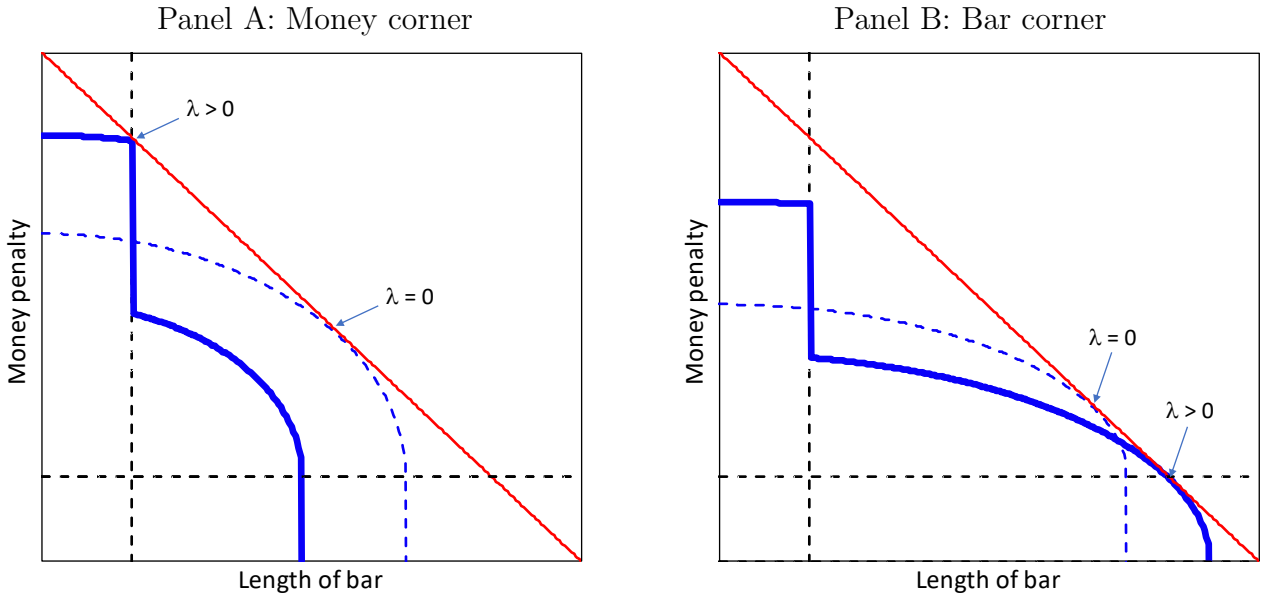


Figure 5: Interior and corner equilibrium

The figure shows indifference curves and equilibrium punishment bundles for offenders with different tolerances to social stigma. Panel A illustrates the equilibrium in which female offenders ($\lambda > 0$, thick solid line) choose a money corner solution and male offenders ($\lambda = 0$, dashed line) choose an interior solution. Panel B presents the equilibrium in which female offenders ($\lambda > 0$, thick solid line) choose a bar corner solution and male offenders ($\lambda = 0$, dashed line) choose an interior solution. In both panels, the red line corresponds to $\gamma = 1$.

findings, the model can predict that women pay lower monetary penalties than men. Following case 3 in solution (19), the model also predicts that female offenders are more likely to face longer professional bars than male offenders.

Second, differential gender punishment preferences can arise from possible gender discrimination in the labor market. Professional bars can impact men less due to gender stereotypes where female misconduct is viewed more negatively by employers. In addition, the "old boys" network can help male offenders with professional bars on their records, even repeat offenders, find employment in finance, while this is much more difficult for female offenders. In the model, the post-misconduct exposure to labor market discrimination is associated with a social stigma threshold, $\overline{b}$, that captures the differential tolerance across genders to professional bars. If women have low $\overline{b}$, they do not choose an interior solution since it is impossible if $\overline{b} \leq b^*$. If men have higher $\overline{b}$ than women, they more often prefer an interior solution (Case 1 in solution (19)), but can also choose corner punishment bundles.

5.2 Taking extended model to the data

This section makes the extended model amenable to estimation. We use the empirical model and simulated method of moments (SMM) to quantify the social stigma associated with SEC enforcement actions, the money-time tradeoff that the SEC applies in its enforcement actions, and the

associated preference parameters of SEC offenders.

Assumptions. As in all prior sections, we assume all penalties (m, b) satisfy the SEC's budget constraint $I = m + \gamma b$, where $\gamma > 0$ measures the SEC's price of professional bars and captures the aggregate money-time tradeoff. A one-year reduction in bar length corresponds to a $\$\gamma$ larger monetary penalty, and vice versa. The SEC's minimum monetary penalty is proportional to total penalty I, $\overline{m} = \mu I$, so that the parameter $\mu \geq 0$ captures the regulatory punishment constraint.

Following the female labor supply literature (e.g., Arrufat and Zabalza (1986)), we parameterize offender i's disutility to be of CES type with share parameter α_i and elasticity β_i. In addition, we assume there is a social stigma associated with any professional bar, $\overline{b} = 0$, and stigma is (to the first order) proportional to the total penalty I and captured by the parameter $\lambda \in [0, 1)$. These assumptions reduce the complexity of the empirical model and can be relaxed to gain extra degrees of freedom to match the data. Stigma disutility is allowed to vary by gender and takes values λ_M and λ_F, respectively, that is, $\lambda_i \in \{\lambda_M, \lambda_F\}$, with $\lambda_M \lessgtr \lambda_F$. Given the dichotomy in penalties observed in the data, however, we expect to find $1 > \lambda_F > \lambda_M > 0$.

Variation in α_i across offenders is needed to capture preferences because we observe various combinations of monetary penalty m and professional bar b in the data. The shares $\alpha_i \sim Logistic(\alpha_\alpha, \sigma_\alpha)$ are drawn from a logistic distribution with shift parameter α_α and dispersion parameter $\sigma_\alpha \geq 0$. Alternatively, we use a normal-normal distribution $\alpha_i \sim \Phi(\mathcal{N}(\alpha_\alpha, \sigma_\alpha)) \in (0, 1)$, which yields similar estimates but a worse fit.[29] The elasticity parameters $\beta_i \geq 1$ vary by gender and take values β_M and β_F, respectively. Given the dichotomy in penalties observed in the data, we expect $\beta_M > \beta_F > 1$.

Under these assumptions, offender i's disutility can be written:

$$\min_{m_i, b_i} U(m_i, b_i) = \left(\alpha_i^{1-\beta_i} m_i^{\beta_i} + (1-\alpha_i)^{1-\beta_i} (\gamma b_i)^{\beta_i}\right)^{\frac{1}{\beta_i}} + \lambda I_i \mathbf{1}\{b_i > 0\} \qquad \text{s.t. } m_i \geq \mu I_i. \tag{21}$$

The model parameters can be captured by the vector $(\gamma, \lambda_M, \lambda_F, \mu, \alpha_\alpha, \sigma_\alpha, \beta_M, \beta_F)$. Given the limited number of data moments available for estimation compared to the number of parameters, we either set $\beta_M = \beta_F$ or $\lambda_M = \lambda_F$ but not both. We estimate the model using the simulated method of moments (SMM).

SMM procedure. We now describe the SMM procedure and the identification of the model parameters. We want to estimate the stigma parameters and the regulatory constraint, $(\lambda_M, \lambda_F, \mu)$,

[29] In the logistic case, the sigmoid transformation ensures that α_i is drawn from the appropriate domain:

$$\alpha_i = \frac{e^{\alpha_\alpha + \sigma_\alpha \varepsilon_i}}{1 + e^{\alpha_\alpha + \sigma_\alpha \varepsilon_i}} \in (0, 1), \tag{20}$$

where ε_i is a standard normal preference shock. In the normal-normal case, we use the Gaussian cdf transformation $\alpha_i = \Phi(\alpha_\alpha + \sigma_\alpha \varepsilon_i) \in (0, 1)$.

and the preference distribution parameters $(\alpha_\alpha, \sigma_\alpha, \beta)$. In addition, we want to identify the SEC's money-time tradeoff γ. The key moments to match are the equilibrium probabilities of interior penalty bundles, money corners, and bar corners.

The probabilities of an interior bundle, money corner, and bar corner vary by the offender's gender, and we use this variation to separately identify (λ_M, λ_F) (or (β_M, β_F)). In the data, the observed share of money in the total penalty is "biased" due to the endogenous choice of interior bundles as opposed to corners. Only certain realizations of shock ε_i and, hence, values of preference parameter α_i lead to an interior bundle. We use the model-implied equilibrium choice probabilities to adjust for this selection bias in α_i for interior bundles. Finally, we use the share of money in the total penalty for all interior bundles to identify the SEC's money-time tradeoff γ.

For notational convenience, drop the dependence on i. For an interior solution, the first-order condition yields a constant money-time allocation rule:

$$m^\star = \alpha I = \frac{\alpha}{1-\alpha}\gamma b^\star, \qquad b^\star = (1-\alpha)\frac{1}{\gamma} I. \tag{22}$$

Solution (22) implies that the equilibrium money-time ratio depends on the offender's preference parameter α and the SEC's price of professional bars, γ:

$$\frac{m^\star}{b^\star} = \frac{\alpha}{1-\alpha}\gamma. \tag{23}$$

At this interior solution, the minimized disutility equals $U(m^\star, b^\star) = (1+\lambda)I$. It rises one-to-one with the social stigma associated with SEC enforcement. The monetary penalty share equals the share parameter, $\alpha = \frac{m^\star}{I}$, which we can use to back out the distribution of α's under the counterfactual assumption $\lambda = \mu = 0$.

In general, one can identify the SEC's money-time tradeoff from the offenders' optimality condition for interior bundles based on (22), which yields the following conditional moment allowing one to identify γ:

$$\mathbb{E}\left[\frac{m}{b} - \frac{\alpha}{1-\alpha}\gamma \,\middle|\, \text{Interior}\right] = 0. \tag{24}$$

In the data, the ratio $\mathbb{E}[\frac{m}{b}|\text{Interior}]$ is about 0.237. With the logit specification, the log-ratio is affine: $\ln m_i^\star - \ln b_i^\star = \ln\gamma + \alpha_\alpha + \sigma_\alpha \varepsilon_i$. Hence,

$$\mathbb{E}\left[\ln m - \ln b \middle| \text{Interior}\right] = \ln\gamma + \alpha_\alpha + \sigma_\alpha \mathbb{E}\left[\varepsilon \middle| \text{Interior}\right], \tag{25}$$

where $\mathbb{E}\left[\varepsilon \middle| \text{Interior}\right]$ depends on the equilibrium probability of choosing a bundle of the monetary penalty and professional bar, which we determine by Monte Carlo simulation methods and which depends on the offenders' preferences.

The equilibrium probabilities for an interior bundle, money corner, and bar corner depend on the model parameters (λ, μ, β) and the distribution of α, which can be seen as follows. The money

corner and bar corner, respectively, yield disutility

$$\begin{aligned} \text{Money corner} \quad &: \quad U(I-\gamma\bar{b},\bar{b}) = \alpha^{\frac{1-\beta}{\beta}} I, \\ \text{Bar corner} \quad &: \quad U(\overline{m},\frac{1}{\gamma}(I-\overline{m})) = (\alpha^{1-\beta}\mu^{\beta}+(1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} I + \lambda I. \end{aligned}$$

Importantly, the disutility is unaffected by social stigma if the offender chooses the money corner while it rises one-to-one with the social stigma if the bar corner is chosen.

The interior bundle is optimal if $m^{\star} \geq \overline{m}$ and $U(m^{\star},b^{\star}) \leq U(I-\gamma\bar{b},\bar{b})$ which is the case when $\alpha^{\frac{1-\beta}{\beta}} \geq 1+\lambda$ and $\alpha \geq \mu$. The money corner dominates if $U(I-\gamma\bar{b},\bar{b}) \leq U(m^{\star},b^{\star})$ and $U(I-\gamma\bar{b},\bar{b}) \leq U(\overline{m},\frac{1}{\gamma}(I-\overline{m}))$ which is the case when $\alpha^{\frac{1-\beta}{\beta}} \leq 1+\lambda$ and $(\alpha^{1-\beta}\mu^{\beta}+(1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} - \alpha^{\frac{1-\beta}{\beta}} \geq -\lambda$. The bar corner dominates if $m^{\star} \leq \overline{m}$ and $U(\overline{m},\frac{1}{\gamma}(I-\overline{m})) \leq U(I-\gamma\bar{b},\bar{b})$ which is the case when $\alpha \leq \mu$ and $(\alpha^{1-\beta}\mu^{\beta}+(1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} - \alpha^{\frac{1-\beta}{\beta}} \leq -\lambda$. Taken together, this discussion leads to the following offenders' choice probabilities:

$$\begin{aligned} \Pr(\text{Interior}) \quad &= \quad \Pr(\alpha^{\frac{1-\beta}{\beta}} \geq 1+\lambda \ \wedge \ \alpha \geq \mu), \\ \Pr(\text{Money corner}) \quad &= \quad \Pr(\alpha^{\frac{1-\beta}{\beta}} \leq 1+\lambda \ \wedge \ (\alpha^{1-\beta}\mu^{\beta}+(1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} - \alpha^{\frac{1-\beta}{\beta}} \geq -\lambda), \\ \Pr(\text{Bar corner}) \quad &= \quad \Pr(\alpha \leq \mu \ \wedge \ (\alpha^{1-\beta}\mu^{\beta}+(1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} - \alpha^{\frac{1-\beta}{\beta}} \leq -\lambda). \end{aligned} \tag{26}$$

Relations (26) yield six moment conditions in total, three for female and three for male offenders, that can be used to estimate the remaining model parameters $(\mu, \lambda_M, \lambda_F, \alpha_\alpha, \alpha_\sigma, \beta)$.

Figure A.1 in the Appendix illustrates the sensitivities of the choice probabilities to the model parameters. Panel A varies stigma λ and, alternatively, the regulatory constraint μ. The plots in Panel A show that the model requires both $\lambda > 0$ and $\mu > 0$ in order to match the data. When $\lambda = 0$, the fraction of offenders choosing a monetary penalty only is zero. This fraction increases to over 50% when $\lambda = 1$. The fraction of bar corners remains high at 60% for all values of λ below some threshold (here 0.64) and declines monotonically thereafter. Interior bundles, on the other hand, make up the remainder, or 40% when $\lambda = 0$. This fraction drops to zero for large λ.

When $\mu = 0$, the fraction of offenders choosing a professional bar only is zero which is inconsistent with the data for both males and females. While the fraction of money corners is unaffected by γ, bar corners increase strongly with γ and make up all non-money corner cases for a large enough γ.

Panel B in Figure A.1 varies the parameters guarding offender preferences. The plots in Panel B show that the α parameters have a rather unique effect on choice probabilities. The probability of interior bundles is hump-shaped in both α_α and σ_α. The intercept parameter α_α increases money corners and decreases bar corners, similar to the dispersion parameter σ_α. But the magnitudes are very different and, hence, the impact on the variation across genders is different. The last plot shows that variation in β across genders can generate corners only when β is small and it generates a mix of interior bundles and corners when β is large.

5.3 Estimates for money-time tradeoff and social stigma

We proceed with the SMM estimation in two stages. In the first stage, we estimate the stigma, regulatory constraint, and preference parameters by matching the six choice probabilities to their data counterparts. In the second stage, we estimate the SEC's money-time trade-off parameter γ using the distribution of $\mathbb{E}[\frac{\alpha}{1-\alpha}|\text{Interior}]$ estimated in the first stage. The optimality condition for interior bundles yields the γ estimate from the conditional moment condition:

$$\widehat{\gamma} = \frac{\mathbb{E}\left[\frac{m}{b}\middle|\,\text{Interior}\right]}{\mathbb{E}\left[\frac{\alpha}{1-\alpha}\middle|\,\text{Interior}\right]}. \tag{27}$$

The numerator in expression (27) is from the data. The denominator in expression (27) is from the first stage. Its magnitude differs from the unconditional expectation, $\mathbb{E}[\frac{\alpha}{1-\alpha}]$, which yields the model's endogenous selection adjustment to the γ estimate.

Panel A of Table 8 reports the SMM parameter estimates. All SMM estimates are economically sensible. In our base specification (1), the estimate for γ is equal to 0.195 which implies the SEC trades off one year of the professional bar against \$195,000 in monetary penalty, which is much larger than \$144,000 obtained from specification (8) motivated by the model without social stigma. The regulatory constraint on mandatory monetary penalties, $\mu = 0.318$, is such that 31.8% of the total fine needs to be in cash.

The estimates of stigma disutility λ vary vastly across genders. While $\lambda_M = 0.101$ indicates that male offenders are subject to a monetized value of social stigma corresponding to 10.1% of the total SEC imposed fine, the estimate for females is almost 3 times larger. The estimate $\lambda_F = 0.301$ implies that female offenders are subject to much more significant social stigma, with a monetized value equal to 30.1% of the total SEC-imposed fine.

The estimates for the preference parameters imply that α has a mean of 0.430 with a standard deviation of 0.432 across offenders. Consistent with a selection bias in α, the alpha variation is different conditional on an interior bundle. Male offenders choosing a combination of monetary and bar penalty have a mean α of 0.532, which is higher than the unconditional mean, and a lower standard deviation of 0.125. The parameter $\beta_F = \beta_M = 1.471$ translates into the elasticity of substitution between the monetary penalties and professional bars equal to $\rho_M = \rho_F = 1/(\beta_F - 1) = 2.12$ implying that female and male offenders consider two types of penalties as substitutes.

Panel B of Table 8 documents the model fit. We compare six sample moments to the model-implied moments. The model fit is reasonably close with a mean-squared error of $3.492{*}10^{-3}$. The different choice probabilities are all matched within 7 percentage points. The model predicts the fraction of male offenders with both monetary penalty and bar to be 10.9% while they represent 15.7% in the data. This gap is largely due to an overestimation of bars only (52.6% model-implied instead of 45.7% in the data), while the monetary penalty-only corner is matched very closely (36.5% model-implied instead of 38.6% in the data). The mismatch flips for female offenders. The model

Table 8: Estimated model parameters and model fit

The table documents the model parameters that are consistent with the data. The parameter estimates are obtained using the simulated method of moments.

Panel A: *Estimated SMM parameters*

	Model specification				
	(1)	(2)	(3)	(4)	(5)
	Baseline	Restricted	Beckerian	Alt distn	Generalized
Model parameters	Logit α_i, $\lambda_M \lessgtr \lambda_F$	Logit α_i, $\lambda_M = \lambda_F$	Logit α_i, $\lambda_{M/F} = 0$	Normal α_i, $\lambda_M \lessgtr \lambda_F$	Logit α_i, $\beta_M \lessgtr \beta_F$
γ	0.195	0.286	NA	0.142	0.179
μ	0.318	0.402	0.994	0.428	0.250
λ_M	0.101	0.732	0.000	0.174	0.110
λ_F	0.301	0.732	0.000	0.346	0.163
α_α	-1.185	-0.212	2.612	-0.084	-1.636
σ_α	6.511	3.379	0.067	5.017	8.436
β_M	1.471	8.402	1.231	2.907	1.834
β_F	1.471	8.402	1.149	2.907	1.188

Panel B: *Model fit*

		Model moments				
		(1)	(2)	(3)	(4)	(5)
		Baseline	Restricted	Beckerian	Alt distn	Generalized
	Data moments	Logit α_i, $\lambda_M \lessgtr \lambda_F$	Logit α_i, $\lambda_M = \lambda_F$	Logit α_i, $\lambda_{M/F} = 0$	Normal α_i, $\lambda_M \lessgtr \lambda_F$	Logit α_i, $\beta_M \lessgtr \beta_F$
Fraction of male offenders with						
- monetary penalty & bar	0.157	0.109	0.064	0.000	0.076	0.113
- monetary penalty only	0.386	0.365	0.458	0.000	0.431	0.361
- bar only	0.457	0.526	0.478	1.000	0.492	0.525
Fraction of female offenders with						
- monetary penalty & bar	0.000	0.032	0.064	0.000	0.042	0.030
- monetary penalty only	0.404	0.442	0.458	0.000	0.465	0.445
- bar only	0.597	0.526	0.478	1.000	0.492	0.525
MSE$*10^3$		3.492	8.723	27,228	4.205	3.451

overpredicts the fraction of female offenders with both monetary penalty and bar by 3.2%. At the same time, it overpredicts the money corner (44.2% model-implied instead of 40.4% in the data) and underpredicts the bar corner (52.6% model-implied instead of 59.7% in the data) for females. This tension presumably arises from the fact that the model generates the same probability of a bar only for both males and females which is not observed in the data.

5.4 Robustness

The remaining columns in Table 8 vary the empirical specification. The model derived and estimated in this section makes a number of modeling and parametric assumptions that we now want to stress

test. Maybe the most controversial assumption is that male and female offenders can be subject to different social stigmas. To test this assumption and highlight the importance of allowing for different stigmas affecting males and females, we can impose the restriction $\lambda_M = \lambda_F$, re-estimate the model and check the goodness of the model fit. Column (2) in Table 8 checks the importance of allowing for different λ_M and λ_F by imposing the constraint $\lambda_M = \lambda_F$.

Panel A, column (2) shows that the parameter estimates are quite sensitive to this restriction. If $\lambda_M = \lambda_F$, the SEC's estimated money-time trade-off is very different, with \$286,000 equivalent to a one-year bar compared to \$195,000 in the baseline model. Ignoring the difference between male and female offenders would thus lead us to overstate the money versus professional bar trade-off. Most strikingly, the estimated stigma disutility is now much larger at 0.732 than it is in column (1). This means that putting male and female offenders in the same bucket would imply an unreasonably large estimate for social stigma, with monetized value amounting to an equivalent of 73% of total SEC punishment. The preference parameter estimates are also very different from the ones reported in column (1), with α_α being much larger and σ_α being much smaller. The parameter $\beta_F = \beta_M = 8.402$ translates in this case into the elasticity of substitution between the monetary penalties and professional bars equal to $\rho_M = \rho_F = 1/(beta_F - 1) = 0.135$. Therefore, female and male offenders consider two types of penalties as complements in this case.

Irrespective of the unreasonable estimates when males and females face the same social stigma, it is important to check if this restriction reduces the quality of the model fit and by how much. Here, the results in Panel B, column (2) are striking. The model fit would be much worse, as the mean-squared error more than doubles when the social stigma is wrongly assumed to be the same for male and female offenders.

Panel A, column (3) reports a special case of no stigma, $\lambda_F = \lambda_M = 0$, which we label as the Beckerian case. In the absence of stigma, the offenders of both genders have to pay a minimum monetary penalty almost as large as the total penalty since the estimate of $\mu = 0.994$ is very close to one. Since monetary penalty can only be mandatory, the punishment bundle can consist of professional bars only thus making the parameter γ undefined. This specification has the largest MSE among all cases equal to 27,228.

The strongest distributional assumption we make in Section 5.2 is summarized in equation (20). While the logit-shock specification is widely used in the literature and parsimoniously captures preference heterogeneity, it is not the only viable specification. Column (4) checks the importance of the distributional assumptions for the share parameters α_i by switching to a different distribution. Here we use a Gaussian cdf transformation, $\alpha_i = \Phi(\alpha_\alpha + \sigma_\alpha \varepsilon_i)$, which also yields alphas in their natural domain (0,1).

Panel A, column (4) shows that the alternative distribution yields similar parameter estimates as for the baseline model in column (1) but a worse model fit as Panel B shows. When comparing parameters between columns (1) and (4), it is worth noting that γ now implies \$142,000 per year which is below the SEC's maximal mandatory penalty per single violation. As noted before,

mandatory monetary penalties apply to "each act or omission" violating the securities laws, and depending on the nature and severity of the violation, they range per violation from \$0 to \$150,000 (until 2013) for individuals. Another difference is that the social stigma disutility estimates are now larger than before, with 17.4% (34.6%) for males (females) compared to 10% (30%) in the baseline model. Our baseline stigma estimates this appear conservative. The preference estimates are also different, with α_α and β larger and σ_α smaller, similar to column (2) but not by as much. Furthermore, the estimate of beta is equal to 2.907 in this case resulting in the elasticity of substitution equal to 0.524. It is less than one thus implying that the monetary penalties and professional bars are complements in this case. Importantly, a comparison of the MSEs reveals that the logit specification in (1) fits much better than the Gaussian specification in (4). First the interior bundles worse for both males and females, and it overpredicts the money corners for males and underpredicts the bar corners for females.

Finally, column (5) checks the importance of imposing the same elasticity between money and time for males and females by allowing for different β_M and β_F. Here we face the limitation that we now have seven parameters and six moments and, hence, the system is underidentified. We can thus not estimate all parameters. A natural choice would be to fix the SEC's γ but this is not feasible since the moments used are different. We decide to set the parameter μ governing the SEC's minimum regulatory punishment at $\mu = 0.25$. The model now suggests that females ($\lambda_F = 0.16$) still face larger social stigma than males ($\lambda_M = 0.11$) while females ($\beta_F = 1.19$) exhibit larger elasticity of substitution between money and time than males ($\beta_M = 1.83$). In this case, both genders treat monetary penalties and professional bars as substitutes. This model has the best fit according to the mean-squared error reported in Panel B.

It is worthwhile to point out that bars and monetary penalties can be either substitutes or complements depending on the model specification. However, the best fit is achieved with female offenders having higher social stigma disutility than male offenders and both genders treating bars and monetary punishments as substitutes.

5.5 Equity and efficiency of SEC enforcements

Equity, efficiency, and optimal deterrence in the context of SEC enforcement is an important but complex issue. Equity is linked to fairness and justice in the distribution of burdens and benefits. In the context of SEC penalties, equity implies that similar offenses should result in similar consequences for offenders which means treating individuals equally under the law. Efficiency relates to achieving desired outcomes with minimal resources or maximizing social welfare. In the context of SEC penalties, efficiency means that the regulatory framework should deter misconduct effectively and minimize the cost of enforcement while maximizing the benefits. Efficiency may or may not align with equity. For instance, offenders with varying financial resources and time-money preferences may respond differently to equal penalty bundles. Finally, optimal deterrence aims to set

penalties at a level that deters potential offenders from engaging in misconduct with the goal of striking a balance between preventing misconduct and avoiding excessive costs.

The SEC's challenge is to strike a balance between equity and efficiency while achieving optimal deterrence. It should naturally consider factors such as the severity of the offense, the financial capacity of the offender, and the potential impact on market integrity when setting penalties. Tailoring penalties to specific cases, rather than one-size-fits-all approaches, may be controversial but may help the SEC achieve both equity and efficiency. In all of this discussion, the level of disutility achieved by male and female offenders and its sources are important considerations.

Table 9 presents disutility measures from SEC punishment for male and female offenders, based on the parameter estimates in specification (1). The disutility is expressed in the units of the SEC's budget constraint, Disutility $= U/I$, where U is the disutility measure (21) and I represents the SEC's budget constraint. The table is divided into two panels: Panel A for male offenders and Panel B for female offenders. The table provides summary statistics for disutility, disutility excluding stigma, stigma, and the ratio of stigma to disutility excluding stigma. Disutility excluding stigma is the disutility from SEC punishment excluding the stigma component. Stigma is the social and reputational damage that offenders incur in units of I. The stigma to disutility excluding stigma ratio gives the proportion of disutility that can be attributed to the stigma component.

The mean disutility for male offenders is 4.7 times I, which indicates the average cost or harm experienced by male offenders due to SEC punishment, relative to the SEC's budget constraint, is high. The spread of values is quite wide, as indicated by the standard deviation of over 26. The stigma component for male offenders is relatively small, with a mean of 0.07 times I. This suggests that, on average, male offenders experience limited social and reputational damage as a result of SEC penalties. The ratio of stigma to disutility is quite low, with an average of 4.3%. This indicates that, on average, the stigma component contributes a relatively small portion of the overall disutility experienced by male offenders.

By contrast, the mean disutility for female offenders is slightly higher than that of male offenders, at 4.88 times I. Female offenders, on average, experience a slightly greater cost or harm from SEC punishment compared to male offenders. The standard deviation is over 29, indicating even larger variability in disutility among female offenders. The stigma component for female offenders is notably higher, with a mean of 0.26 times I. This suggests that female offenders, on average, experience a more significant level of social and reputational damage as a result of SEC penalties. The ratio of stigma to disutility for female offenders is also higher than that of male offenders, with an average of 11%. This indicates that, on average, the stigma component contributes a larger portion of the overall disutility experienced by female offenders compared to their male counterparts. Without the stigma component, disutility from punishment is slightly higher for females than males at the mean and median, but not at 75%.

When put together, Table 9 highlights key differences between male and female offenders: Female offenders, on average, experience slightly higher disutility compared to male offenders. The

Table 9: Disutility from SEC punishment

The table documents the disutility from SEC punishment. Offender disutility is measured relative to the SEC's budget constraint I, Disutility $= U/I$.

	Mean	SD	25%	Median	75%
Panel A: *Male offenders*					
Disutility	4.701	26.579	1.012	1.109	2.291
Disutility ex stigma	4.631	26.575	1.000	1.008	2.190
Stigma	0.070	0.044	0.012	0.101	0.101
Stigma/Disutl. ex stigma	0.043	0.038	0.005	0.034	0.083
Panel B: *Female offenders*					
Disutility	4.875	29.365	1.013	1.311	2.479
Disutility ex stigma	4.687	29.350	1.000	1.010	2.178
Stigma	0.188	0.136	0.013	0.301	0.301
Stigma/Disutl. ex stigma	0.110	0.107	0.009	0.074	0.205

variability in disutility is also higher among female offenders, suggesting a wider range of personal costs. Female offenders, on average, face a significantly higher stigma component, which contributes more to their overall disutility. Overall, the data suggests that female offenders face more significant social and reputational impacts from SEC punishment compared to male offenders. The analysis highlights the importance of considering offender gender when assessing the impact of regulatory penalties in the financial industry.

6 Counterfactual Policy Analysis and Gender Equity

In this section, we shift our focus towards evaluating the impact of SEC policies on gender equity, specifically by studying welfare disparities between male and female offenders. We leverage the parameter estimates for offenders' preferences, social stigma, and the SEC's money-time tradeoff to conduct several policy experiments. We aim to assess the potential gender-specific impacts of these policy choices. We consider three policy experiments:

1. *Allowing vs. prohibiting punishment bundles:* This experiment explores the flexibility in punishment choices by comparing scenarios where punishment bundles are either allowed or prohibited. We examine whether there are gender-based differences in the utilization of punishment bundles, which can shed light on potential disparities in how men and women navigate the regulatory landscape.

2. *No bars, only monetary penalties:* In this experiment, we focus on scenarios where only monetary penalties are imposed, without the inclusion of other regulatory constraints. By doing so, we aim to understand if there are gender-specific differences in how monetary penalties impact male and female offenders. This experiment subsumes the first experiment while further

restricting the policy environment.

3. *Eliminating regulatory constraints:* This policy experiment explores the effects of eliminating specific regulatory constraints. We assess the impact of removing the minimum monetary penalty requirement and expanding the choice set available to offenders. We anticipate that this change may lead to more female offenders choosing monetary penalties only, where the regulatory constraint previously bound them. This scenario could result in improved outcomes for female offenders, and we aim to understand whether the impact aligns with the second experiment.

These policy experiments serve as tools to assess the welfare and equity implications of the SEC's policy choices. By examining how different offenders, especially those of different genders, are affected by the same regulatory changes, we can gain insights into the sources of heterogeneity in outcomes. Ultimately, our goal is to provide a nuanced understanding of how these policy decisions impact gender equity within the context of SEC punishments.

6.1 Punishment bundles

We first consider the welfare impact of allowing for bundles of money and bars. Suppose the SEC would force offenders to choose either a monetary penalty or a professional bar, but not a combination of the two beyond the regulatory constraint $\overline{m}$. In this case, an offender's choice is the money corner iff:

$$(\alpha^{1-\beta}\mu^{\beta} + (1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} - \alpha^{\frac{1-\beta}{\beta}} + \lambda \geq 0. \tag{28}$$

If all bundles are allowed:

$$U(\alpha,\beta,\lambda;\mu,I) = \begin{cases} \min[1+\lambda, \alpha^{\frac{1-\beta}{\beta}}, (\alpha^{1-\beta}\mu^{\beta} + (1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} + \lambda] \times I & \text{if } \alpha > \mu, \\ \min[\alpha^{\frac{1-\beta}{\beta}}, (\alpha^{1-\beta}\mu^{\beta} + (1-\alpha)^{1-\beta}(1-\mu)^{\beta})^{\frac{1}{\beta}} + \lambda] \times I & \text{if } \alpha \leq \mu. \end{cases} \tag{29}$$

Condition (29) shows that the welfare gain from allowing for bundles accrues exclusively to intermediate-α and more to male than female offenders. There are two types of offenders unaffected by bundles, the high-α money corner offenders with $\alpha > (1+\lambda)^{\frac{\beta}{1-\beta}}$ and the low-α bar corner offenders with $\alpha \leq \mu$ and $\alpha^{1-\beta}\mu^{\beta} + (1-\alpha)^{1-\beta}(1-\mu)^{\beta} > 1$.

Table 10 documents the fraction of offenders being better off by allowing for bundles, the disutility before and after policy intervention in Panel A, and the associated welfare gain in Panel B. The welfare gains/losses are distributed unevenly. A total of 10.8% of male offenders benefit from the punishment bundles with an average welfare gain of 2.8%. By contrast, only 3.2% of female offenders benefit from the punishment bundles with an average welfare gain of merely 0.4%. For male offenders, restricting punishment bundles increases disutility from 1.10 to 1.13 on average and for the median offender. For female offenders, restricting punishment bundles increases disutility only marginally from 1.301 to 1.305 on average. Panel C documents the types of winners. For male

Table 10: Counterfactual SEC punishment policy: Bundles

The table documents the welfare impact of allowing for punishment bundles and the distribution of affected offenders.

Panel A: *Disutility before/after restricting punishment bundles*					
Male, fraction affected			10.8%		
Female, fraction affected			3.2%		
	Disutility before/after				
	Mean	SD	25%	Median	75%
Male, affected before	1.101	0.000	1.101	1.101	1.101
Female, affected before	1.301	0.000	1.301	1.301	1.301
Male, affected after	1.129	0.023	1.108	1.125	1.148
Female, affected after	1.305	0.003	1.302	1.304	1.308
Male, all after	4.704	26.579	1.012	1.143	2.291
Female, all after	4.875	29.365	1.013	1.312	2.479
Panel B: *Welfare impact of allowing for punishment bundles*					
	Welfare gain (+)/loss (−)				
	Mean	SD	25%	Median	75%
Male, affected	0.028	0.023	0.007	0.024	0.047
Female, affected	0.004	0.003	0.001	0.003	0.007
	Panel C: *Distribution of affected offenders*				
	Distribution of α_i				
	Mean	SD	25%	Median	75%
Male, affected	0.532	0.125	0.421	0.532	0.643
Female, affected	0.377	0.035	0.347	0.376	0.407

offenders, a wide range of offenders benefits, with mean/median α of 0.53 and standard deviation of 0.12. Female offenders only benefit if α is in a narrow range around 0.38. These results illustrate that in a Beckerian environment in which the SEC allows offenders to negotiate their bundles, it is mostly male offenders who benefit.

6.2 Monetizing bars

We next consider the welfare impact of monetizing all bars. This corresponds to a setting with $\mu = 1$. Strictly speaking, the economic approach to crime and punishment according to Becker (1968) suggests making punishments comparable by monetizing bars. Naturally, each offender would put a different monetary value on a bar, since the cost of imprisonment, as Becker puts it, is the person-specific discounted sum of the earnings foregone and the value placed on the restrictions in consumption and freedom. Hence, even if the SEC used the same γ to monetize bars, the money-time tradeoff is different for different offenders and is a function of social stigma.

Suppose the SEC would allow offenders to monetize all professional bars according to its own

money-time tradeoff. Importantly, all social stigma would be eliminated by this proposal since all offenders are being treated identically and, as we have shown, the disutility is unaffected by social stigma if the offender chooses the money corner while it rises with λ in all other cases. In this case, an offender's utility is independent of λ:

$$U(\alpha, \beta, \lambda; \mu = 1, I) = \alpha^{\frac{1-\beta}{\beta}} I. \tag{30}$$

Table 11 documents the fraction of offenders being worse off by monetizing all bars and the disutility before and after regulatory intervention in Panel A and the associated welfare losses in Panel B. Interestingly, the welfare impact of monetizing professional bars is negative among offenders and across genders. However, the mean is much larger in absolute terms than the median, suggesting the effect is skewed. Even at the 25% quantile offender welfare drops. Compared to Table 10, the welfare drop of imposing the money corner is large. For male offenders, the average and median welfare drops are smaller than for female offenders, presumably because females are more inclined to exit the financial industry.

Panel A in Table 11 shows that average disutility drops from 6.84 (1.69) to 20.08 (3.94) at the mean (median) for male offenders compared to from 7.90 (2.18) to 22.90 (4.96) for female offenders. Hence, monetizing professional bars would not only drastically increase disutility from punishment but also widen the gap between male and female offenders.

Panel C in Table 11 shows that more male than female offenders would be affected by the change. A total of 63.3% male and 55.9% female offenders would suffer from the money-only punishment. When comparing the distributions of affected offenders, the results are again very different from Table 10 as the αs are much lower. It is naturally mostly low-alpha offenders that would suffer from monetary penalties, as opposed to punishment bundles that affect offenders in the middle of the alpha distribution. Comparing across genders, female offenders tend to have lower alphas than male offenders just like in Table 10.

6.3 Eliminating regulatory constraints

Another policy option for the SEC is to eliminate minimum monetary penalties irrespective of the severity of the crime. We next consider the welfare impact of eliminating regulatory constraints on minimum monetary penalties. This corresponds to a setting with $\mu = 0$. Suppose the SEC would allow offenders to not pay any monetary penalty but instead take a leave from the finance profession if they wish to do so. While this may sound like a straightforward policy option, it can have massive welfare and distributional effects.

Table 12 documents the fraction of offenders being better off by eliminating the regulatory constraints on minimum monetary penalties and the disutility before and after in Panel A and the associated welfare gains in Panel B. Somewhat surprisingly, this policy counterfactual has a large welfare impact and the impact is positive throughout. Both male and female offenders would be

Table 11: Counterfactual SEC punishment policy: Monetizing bars

The table documents the welfare impact of monetizing bars and the distribution of affected offenders.

Panel A: *Disutility before/after monetizing professional bars*					
Male, fraction affected			63.3%		
Female, fraction affected			55.9%		
	Disutility before/after				
	Mean	SD	25%	Median	75%
Male, affected before	6.836	33.217	1.134	1.686	4.121
Female, affected before	7.895	39.009	1.448	2.181	4.937
Male, affected after	20.082	104.493	1.762	3.941	11.991
Female, affected before	22.902	122.667	2.303	4.963	13.968
Male, all after	13.087	83.651	1.012	1.581	6.011
Female, all after	13.264	92.358	1.013	1.601	5.971
Panel B: *Welfare impact of monetizing professional bars*					
	Welfare gain (+)/loss (−)				
	Mean	SD	25%	Median	75%
Male, affected	-13.247	71.276	-0.628	-2.255	-7.870
Female, affected	-15.006	83.658	-0.855	-2.782	-9.031
Panel C: *Distribution of affected offenders*					
	Distribution of α_i				
	Mean	SD	25%	Median	75%
Male, affected	0.128	0.203	0.000	0.014	0.171
Female, affected	0.063	0.106	0.000	0.007	0.074

impacted in about the same proportions, 52.5% males vs. 52.7% females, and by the same amount, 6.92 (6.70) welfare gains for males (females) at the mean and 1.05 (1.03) at the median.

Panel A in Table 12 shows that for the affected offenders, average (median) disutility drops from 8.02 (2.15) to 1.10 (1.10) for male offenders and from 8.30 (2.33) to 1.30 (1.30) for female offenders. Even more strikingly, the standard deviation across offenders affected by the policy intervention drops to zero—equalizing the disutility across all of the same gender. Between male and female offenders, the disutility gap drops from 0.28 to 0.20 on average but rises from 0.18 to 0.20 for the median affected offender. Comparing all offenders in Table 9 to the last two rows of Panel A in Table 12, the average disutility gap drops from 0.17 (4.875-4.701) to 0.11 (1.188-1.070) while for the median offenders the change is minuscule.

Panel C in Table 12 shows that similar to the monetizing bars experiment in Table 11, it is mostly low-alpha offenders being affected by eliminating regulatory constraints. The average alpha is a mere 0.044 for both males and females and even at 75%, alpha is 0.05. This means that simple policy choices exist that can improve welfare while adhering to the core SEC's two-dimensional money-time tradeoff and these policy changes need not be discriminatory, either explicitly or implicitly.

Table 12: Counterfactual SEC punishment policy: Eliminating regulatory constraint on monetary penalty

The table documents the welfare impact of eliminating regulatory constraints on minimum monetary penalties and the distribution of affected offenders.

Panel A: *Disutility before/after eliminating regulatory constraints*					
Male, fraction affected			52.5%		
Female, fraction affected			52.7%		
	Disutility before/after				
	Mean	SD	25%	Median	75%
Male, affected before	8.022	36.379	1.319	2.150	5.190
Female, affected before	8.298	40.148	1.522	2.331	5.283
Male, affected after	1.101	0.000	1.101	1.101	1.101
Female, affected after	1.301	0.000	1.301	1.301	1.301
Male, all after	1.070	0.044	1.012	1.101	1.101
Female, all after	1.188	0.136	1.013	1.301	1.301
Panel B: *Welfare impact of eliminating regulatory constraints*					
	Welfare gain (+)/loss (−)				
	Mean	SD	25%	Median	75%
Male, affected	6.921	36.379	0.218	1.049	4.089
Female, affected	6.997	40.148	0.221	1.030	3.982
Panel C: *Distribution of affected offenders*					
	Distribution of α_i				
	Mean	SD	25%	Median	75%
Male, affected	0.044	0.075	0.000	0.005	0.051
Female, affected	0.044	0.075	0.000	0.005	0.050

Overall, these results indicate that the SEC's or, for that matter, any other regulator's policy choices are not innocuous. They can disproportionately affect different offenders, for better or worse, and can create disparities across genders even if they are a-priori unbiased.

7 Conclusion

This paper studies whether gender-neutral enforcement of the high-stakes financial crimes by the SEC is equitable. SEC targets major financial crimes through monetary penalties and professional bars thus providing a unique setting to investigate the money versus time trade-off at the core of the economic approach to criminal punishment and the impact of this trade-off on offenders of different gender. For all SEC enforcement cases against individuals between 2003 and 2018, we find that monetary fines and bars are substitutes (Becker (1968)) and that female and male offenders receive comparable total punishment for the same type of misconduct (Becker (1957)). However, women

receive longer bars and smaller monetary penalties. Strikingly, women exclusively receive either monetary penalties or professional bars while some men receive both penalties.

This evidence is consistent with a model of enforcement where for offenders money and bar are substitutes and admitting guilt through accepting a professional bar entails social stigma. We estimate the model in the data to find that the SEC trades off one year of the professional bar against $195,000 in a monetary penalty. Our estimates of stigma disutility are large and vary across genders. While male offenders are subject to a monetized value of social stigma corresponding to 10% on top of the total SEC-imposed fine, female offenders are subject to much more significant social stigma, with a monetized value over 30% of the total SEC-imposed fine.

We conduct three counterfactual policy experiments to assess the welfare impact of SEC policy choices and explore the source of heterogeneity in punishment outcomes: allowing vs. prohibiting punishment bundles, monetizing professional bars, and eliminating regulatory constraints on the minimum money penalty. These counterfactuals yield surprising results. While the first counterfactual is welfare-improving overall, the welfare gains are distributed unevenly with male offenders benefiting more than female offenders. The welfare impact of monetizing professional bars, which should be optimal according to Becker (1968), is surprisingly negative among offenders and across genders. Male offenders once again come out to be better off than female offenders as their welfare drop is smaller. The final policy option for the SEC is to eliminate minimum monetary penalties irrespective of the severity of the crime. While this may sound like an innocuous policy option, we find that it has a positive welfare effect with both male and female offenders impacted in about the same proportions.

Our findings imply that simple policy choices exist that can alter offenders' welfare while adhering to the core SEC's two-dimensional money-time tradeoff and these policy changes need not be discriminatory, either explicitly or implicitly. However, the SEC's or, for that matter, any other regulator's policy choices are not innocuous. They can disproportionately affect different offenders, for better or worse, and can create disparities across genders even if they are a-priori unbiased.

Another important implication of our findings is that social norms may continue affecting females who have succeeded in breaking the "glass ceiling" in the corporate world. The majority of female white-collar professionals, including those at the very top of the corporate ladder, who have violated the U.S. securities laws elect to permanently leave their employment field in favor of other opportunities, while comparable in every dimension male offenders elect to stay. In addition, potential entrants into male-dominated fields, like finance, or/and executive-level positions can be discouraged from entering due to perceived over-enforcement of gender-specific norms and stereotypes on them. This further increases gender imbalance in already male-dominated professions.

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Appendix

Table A.1: Differences in SEC enforcement cases between female and male offenders

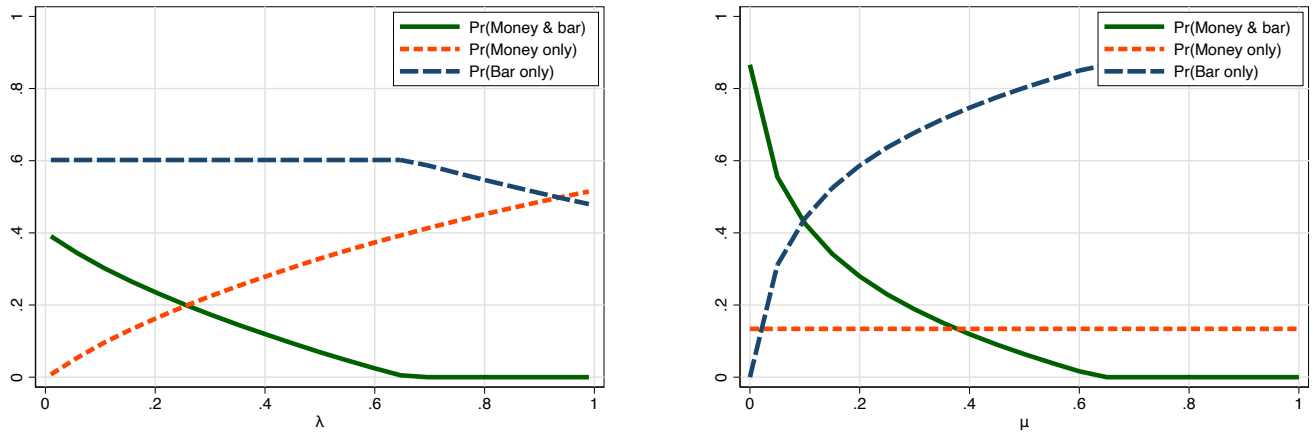
The table documents the characteristics of offenders in SEC trial cases. The sample consists of all offenders in each legal case against individuals in the SEED database between 2003 and 2018. The number of individual cases/offenders is 574. The total number of civil and administrative proceedings is 648. Standard errors are clustered at the legal case. Significance levels are * 10%, ** 5%, *** 1%, # .1%.

	Female offenders	Male offenders	Female – Male
Panel A: *Allegation type*			
Issuer reporting and disclosure	0.58#	0.53#	0.05
Broker-dealer and trading	0.07∗	0.14#	−0.08∗
Investment advisory	0.10∗∗	0.14#	−0.04
Securities offering	0.05∗	0.06#	−0.01
Market manipulation	0.13∗	0.06∗	0.08
FCP Act	0.00	0.04∗∗∗	−0.04∗∗∗
Munis and public pension	0.03	0.02∗∗∗	0.01
Other	0.03	0.01∗∗	0.02
Panel B: *Filing format and number of offenders*			
Civil filing only	0.43#	0.48#	−0.04
Administrative filing only	0.42#	0.40#	0.02
Civil and administrative filing	0.15∗∗∗	0.13#	0.02
No. of offenders per trial	2.93#	3.52#	−0.58
Panel C: *Violations*			
Exchange Act Rule12b20	0.00	0.01∗∗	−0.01∗∗
Exchange Act Rule13a1	0.07∗∗	0.18#	−0.12∗∗∗
Exchange Act Rule13a13	0.00	0.01∗∗	−0.01∗∗
Exchange Act Rule13a14	0.07∗∗	0.18#	−0.11∗∗∗
Exchange Act Rule13a15	0.00	0.00	−0.00
Exchange Act Rule14a3	0.00	0.02∗∗∗	−0.02∗∗∗
Exchange Act Rule14a9	0.00	0.03#	−0.03#
Exchange Act Sec10bRule10b5	0.45#	0.45#	−0.00
Exchange Act Sec13a	0.00	0.01∗∗∗	−0.01∗∗∗
Exchange Act Sec13b2A	0.02	0.02∗∗	−0.00
Exchange Act Sec13b2B	0.02	0.02∗∗	−0.00
Exchange Act Sec13b5	0.27#	0.25#	0.01
Exchange Act Sec14a	0.00	0.03#	−0.03#
Exchange Act Sec14eRule14e3	0.00	0.00	0.00
Exchange Act Sec15c	0.00	0.00	−0.00
Exchange Act Sec20a	0.02	0.01∗	0.01
Exchange Act Sec20e	0.00	0.02∗∗	−0.02∗∗
Exchange Act Sec30A	0.00	0.04∗∗∗	−0.04∗∗∗
Securities Act Sec15b	0.00	0.00	−0.00
Securities Act Sec17a	0.27∗∗∗	0.30#	−0.03
Securities Act Sec17a1	0.12∗∗∗	0.08#	0.03
Securities Act Sec17a2	0.10∗∗	0.16#	−0.06
Securities Act Sec17a3	0.17∗∗∗	0.18#	−0.02
Securities Act Sec5	0.02	0.03∗∗	−0.01
Securities Act Sec5a	0.02	0.03∗∗	−0.01
Securities Act Sec5c	0.02	0.03∗∗	−0.01

Table A.1: Differences in characteristics of SEC enforcement cases between female and male offenders—Continued

	Female	Male	Female – Male
Panel D: *Job position*			
FounderOwner	0.02	0.05#	−0.03∗
CEO	0.05∗	0.20#	−0.15#
CFO	0.22#	0.15#	0.06
Chief	0.20∗∗∗	0.10#	0.10
DirectorChairman	0.07∗∗	0.12#	−0.05
Director	0.27#	0.18#	0.09
Head	0.02	0.03#	−0.01
Controller	0.07∗∗	0.06#	0.00
Manager	0.15∗∗∗	0.07#	0.08∗
President	0.05∗	0.11#	−0.06∗∗
VicePresident	0.17∗∗∗	0.21#	−0.04
Associate	0.00	0.02∗∗∗	−0.02∗∗∗
BrokerTraderSpecialist	0.02	0.10∗∗∗	−0.08∗∗∗
Panel E: *Court state*			
Alabama	0.00	0.00	−0.00
California	0.03	0.02∗∗	0.01
Connecticut	0.00	0.00	−0.00
Delaware	0.00	0.01	−0.01
DC	0.03	0.06#	−0.03
Florida	0.03	0.03∗∗∗	0.00
Illinois	0.05∗	0.03∗∗	0.02
Indiana	0.00	0.01	−0.01
Kansas	0.00	0.01	−0.01
Louisiana	0.00	0.01	−0.01
Maryland	0.00	0.01	−0.01
Massachusetts	0.08	0.03∗∗	0.05
Michigan	0.00	0.00	−0.00
Nebraska	0.00	0.00	−0.00
New Jersey	0.02	0.01∗	0.01
New York	0.10∗∗	0.11#	−0.01
North Carolina	0.02	0.00	0.01
Ohio	0.02	0.01	0.01
Pennsylvania	0.00	0.00	−0.00
Puerto Rico	0.00	0.00	−0.00
Rhode Island	0.00	0.01	−0.01
Texas	0.00	0.04∗∗	−0.04∗∗
Wisconsin	0.03	0.00	0.03
No Court Specified	0.00	0.00	−0.00
Missing	0.58#	0.60#	−0.02

Panel A: Stigma λ and regulatory constraint μ.



Panel B: Offender preferences $(\alpha_\alpha, \sigma_\alpha, \beta)$.

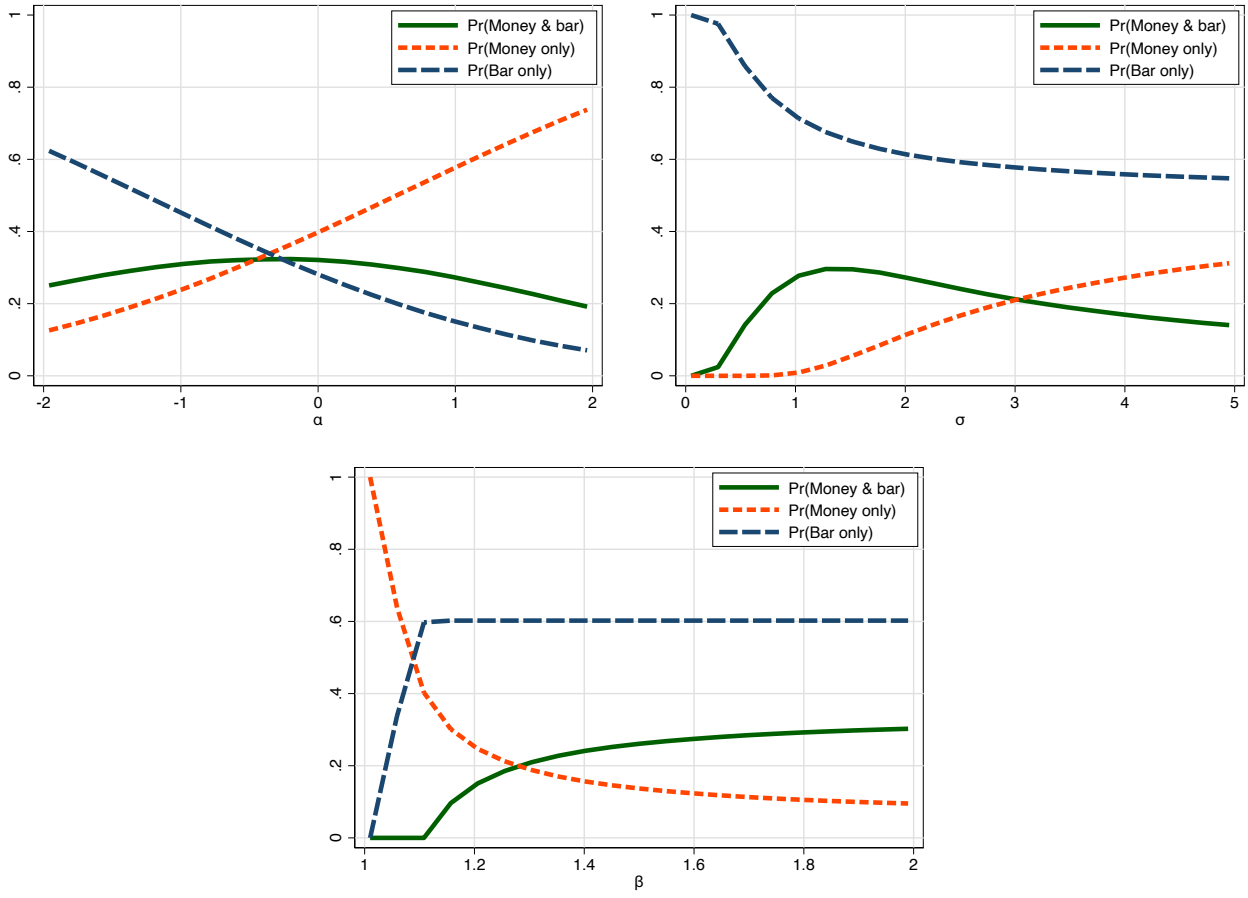


Figure A.1: Moment sensitivity to model parameters.

The figure shows the dependence of the choice probabilities on the model parameters (λ, μ) in Panel A and $(\alpha_\alpha, \sigma_\alpha, \beta)$ in Panel B.